

SMITHSONIAN

# Zoogoer

For members of FRIENDS OF THE NATIONAL ZOO  
SEPT | OCT | 2012

## Smart Guy

Komodo dragons are intelligent and even playful.

- » Self-portraits From the Wild
- » Forests and Climate Change
- » Aldabra Tortoises



Good day.

Great day.



# 10

## Dragons at Play

Earth's largest lizards may not seem charismatic at first glance.

Take a closer look, though, and you'll discover that Komodo dragons are smart and even playful.

BY PHYLLIS MCINTOSH

SEPT | OCT | 2012 | Vol 41, No 5

## FEATURES

### 16 Visual Aids

BY KATRINA DEPTULA

A simple idea—sticking cameras on trees—has proven to be one of the biggest breakthroughs in conservation biology.

### 22 A Focus on Forests

BY NADIA HLEBOWITSH

Forests are crucial ecosystems—not just as animal habitats but as storehouses for carbon, a key factor in global climate change.

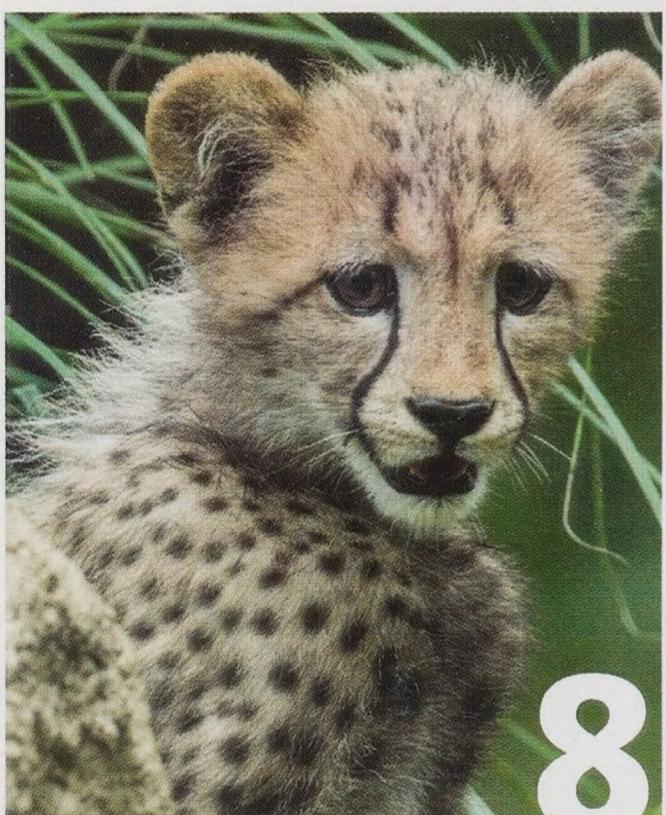


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## DEPARTMENTS

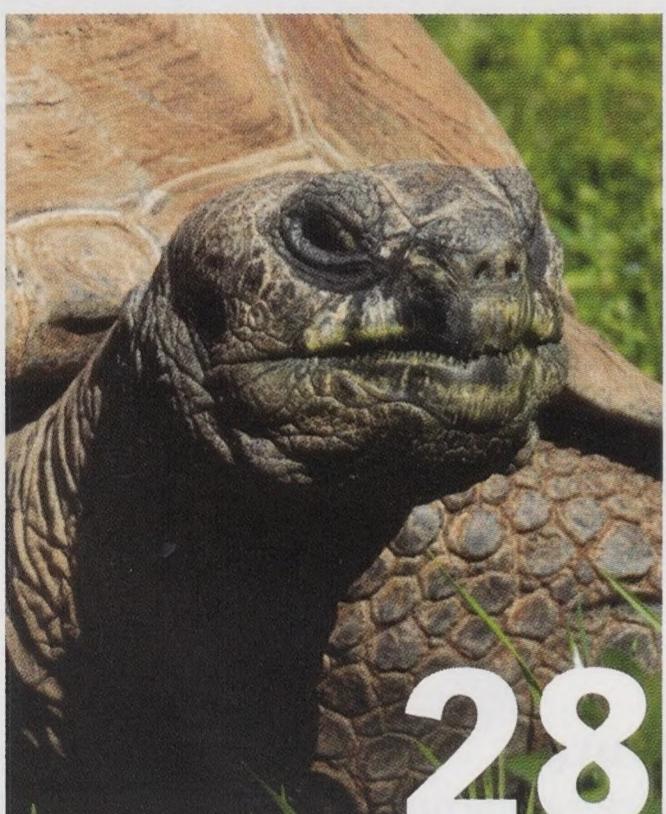
6

CHRISTIAN ZIEGLER/SMITHSONIAN TROPICAL RESEARCH INSTITUTE



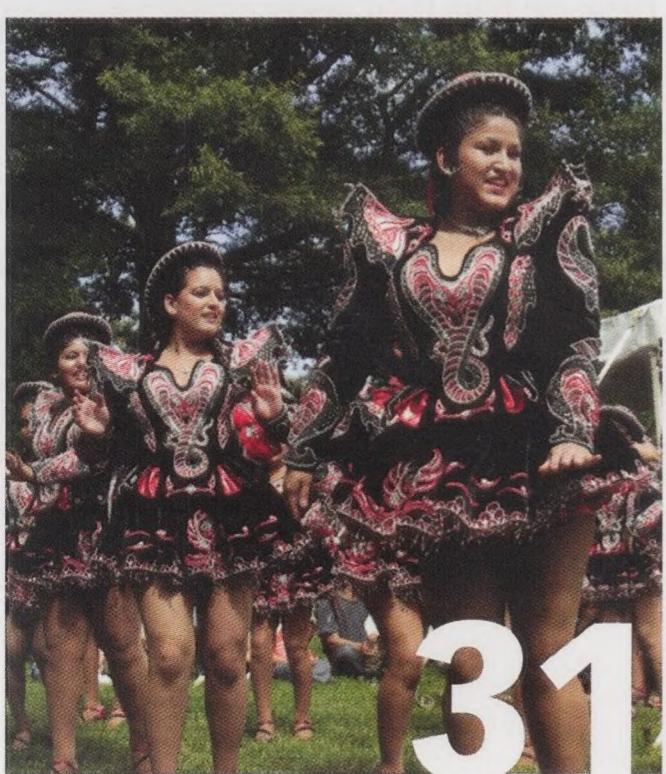
8

SMITHSONIAN'S NATIONAL ZOO



28

MEGHAN MURPHY/NZP



31

MEGHAN MURPHY/NZP

### 3 From FONZ

Transform your next Zoo visit by bringing our new mobile app along.

### 4 From the Zoo

Back to school has special meaning on our Front Royal campus this year.

### 5 Zoo News

Endangered crocodile hatchlings, a miscellany of cool cats, two deaths in the Zoo family, sobering research on biodiversity, a flamingo chick, and more.

### 27 Kids Corner

Supersize fish with piranha-proof armor, meerkat manners, tank-like tortoises, and a cheetah champion.

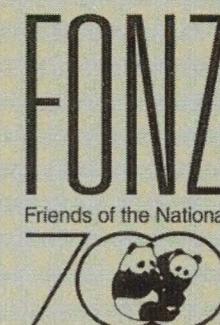
### 31 FONZ

Fabulous fall events, annual meeting, FONZ Board elections, an array of great classes, and more.

### 36 Zoo View

A strange sound startles our cheetah cubs.

# SMITHSONIAN Zoogoer



is the dedicated partner of the Smithsonian's National Zoological Park. FONZ provides exciting and enriching experiences to connect people with wildlife. Together with the Zoo, FONZ is building a society committed to restoring an endangered natural world. Formed in 1958, FONZ was one of the first conservation organizations in the nation's capital.

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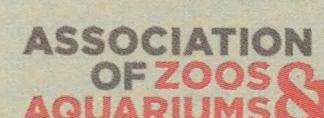


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**On the cover:** Murphy, the Zoo's Komodo dragon, lives behind the Invertebrate Exhibit.

PHOTO BY MEGHAN MURPHY/NZP



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## LET'S GO SEE

### MARITIME EXPLORER JACQUES COUSTEAU HAD A FAMOUS

**CATCHPHRASE: "LET'S GO SEE."** After his death in 1997, family members and friends wrote about how often and eagerly the great diver said that. It was, they realized, a perfect, pithy summation of Cousteau's curiosity, genius, and zeal for exploring.

It is also, I think, a wonderful invitation to extend to Friends of the National Zoo members as a very warm summer gives way to the crisp and colorful glories of autumn. With the exciting new American Trail exhibit now open, I strongly encourage you to add the Zoo to your list of fall destinations—and to bring along friends who may not yet have experienced recently its wonders.

Just as Cousteau created gear that helped him go see the marvels of the deep, FONZ is proud to announce the creation of our own exploration tool—the Smithsonian's National Zoo mobile app. It's an amazing, interactive resource that will add immeasurably to your Zoo visits. Equipped with the new app, you can enrich your experience and extend your visit beyond the Zoo grounds.

The app can help you organize your whole Zoo adventure. Before arriving, you can plan your route through the park or select one of several suggested tours, including a path designed for families with children. You can also get the times and places for the more than 30 animal demonstrations that take place each day.

On your way to Zoo, you can get up-to-the-minute information about the next Metro train or bus. Once you're here, you can enlist the GPS feature to show you exactly where you are on the grounds, find the nearest animals to go see, and locate amenities. In effect, you can customize your own tour.

Back home, you can continue the exploration by augmenting your memories with the fascinating information in our 300 animal profiles. You can continue to view some of our most popular creatures via live webcams or even "Zooify" yourself by adorning your own picture with the ears, snouts, and "smiles" of the Zoo's animals.

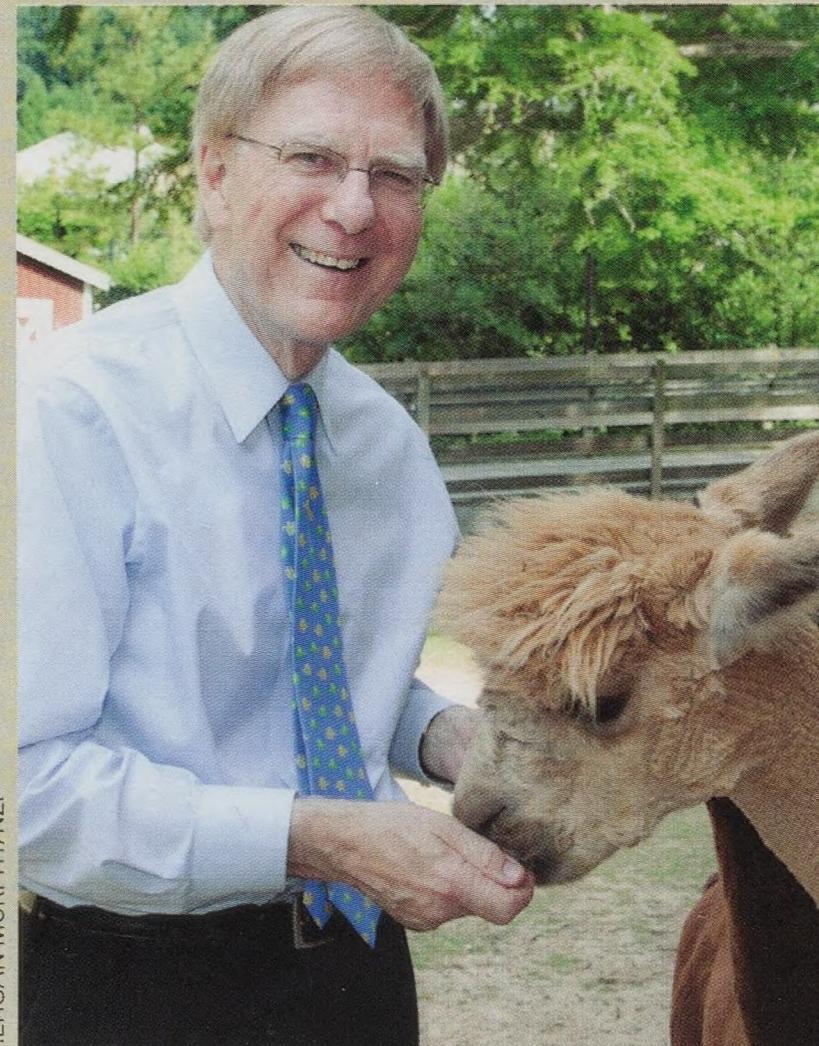
The app is available for iPhones and Androids. For more details, see page 32 or go to [fonz.org/app.htm](http://fonz.org/app.htm).

So gear up and see the treasures of the Zoo in a new, convenient, and enriched way.

Sincerely,

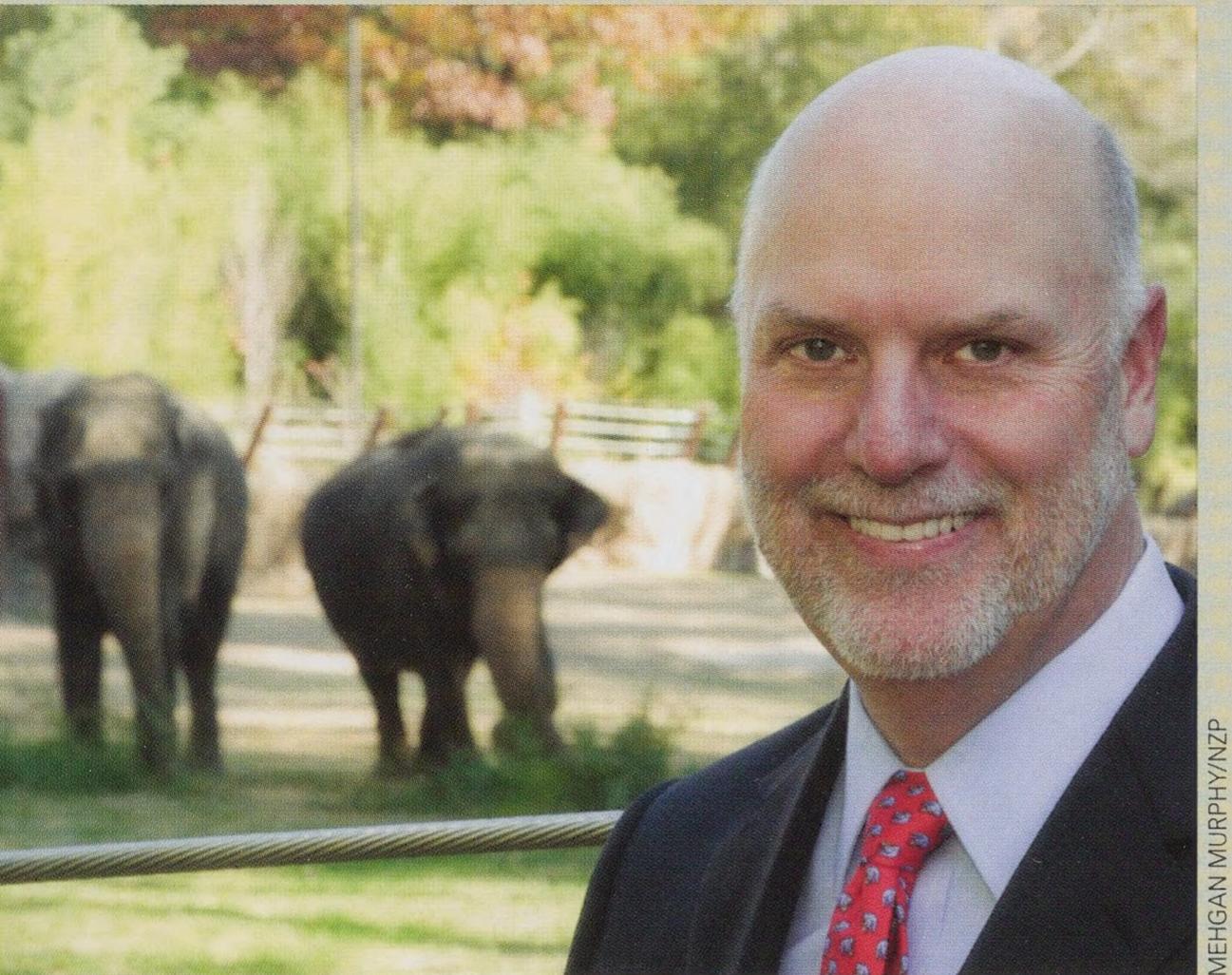
Bob Lamb

Executive Director, Friends of the National Zoo



MEGHAN MURPHY/NZP

## A NEW JEWEL IN OUR GROWN



### IN 2008, THE SMITHSONIAN'S NATIONAL ZOO BEGAN AN EXCITING PARTNERSHIP WITH GEORGE MASON UNIVERSITY.

Together, we created a hands-on, interdisciplinary program in conservation biology. Based at the Smithsonian Conservation Biology Institute (SCBI) headquarters in Front Royal, the Smithsonian-Mason School of Conservation provides opportunities for undergraduate and graduate students, along with conservation professionals, to delve into the vital and complex science of saving animals. SCBI director Steve Monfort put it well: "We provide students and professionals with the tools needed to translate knowledge of the natural world into actions that will sustain a biodiverse planet."

Participants enjoy a truly active education. Working alongside researchers and animal care staff, they learn the latest conservation science and wildlife-management techniques, equipping themselves to be effective conservation professionals and informed citizens. The school also welcomes students from other fields—such as journalism, economics, and business—who seek to enrich their work with a thorough grounding in conservation biology.

This fall brings the start of a wonderful new chapter in the program's story: the opening of the stunning new School of Conservation at SCBI Front Royal. The freshly completed complex includes a state-of-the-art academic center and comfortable living quarters. The academic center features three teaching laboratories, four classrooms, office space for teachers and students, and an atrium where participants can mingle and exchange ideas. The living quarters include 60 double-occupancy rooms, allowing for a sixfold increase in the number of program participants, as well as an exercise facility and study space. I invite you to see this masterpiece for yourself during the Autumn Conservation Festival on October 6-7. You can learn more about this popular event on page 33.

As you explore, please take note of the Earth-friendly architecture. My colleagues and I are particularly proud of how the new complex underscores the school's conservation message through buildings that adhere to the highest Leadership in Energy and Environmental Design standards set by the U.S. Green Building Council. Reliance on geothermal energy lessens our power needs. Green roofs collect rainwater, lower heating and cooling costs by providing insulation, and help create wildlife habitats. Low-flow fixtures save water, as does our wildlife-friendly landscaping, which requires no irrigation. As a result, Smithsonian-Mason students will not just learn conservation. They'll live it.

At the groundbreaking ceremony in June 2011, the program's executive director, Alonso Aguirre, spoke of how the new complex was a thrilling opportunity "to literally build upon this unique partnership between two highly regarded institutions." Watching that opportunity take shape into gleaming new structures has been even more thrilling. And now comes the best part of all: welcoming students to a magnificent new school that affords them the chance, as Aguirre put it, "to live and learn in a collaborative environment where conservation is happening every day."

Sincerely,

Dennis Kelly  
Director, Smithsonian's National Zoological Park

## American Trail Opens



PAMELA BAKER-MASSON/NZP

**L**abor Day weekend witnessed the start of an exciting chapter in the Zoo's history: the opening of the magnificent new American Trail. Its focus on North American wildlife echoes the Zoo's historic mission of conserving species dear to American hearts.

Residents of this vast new exhibit include gray seals, California sea lions, river otters, beavers, bald eagles, and brown pelicans. Several trail dwellers are new to the Zoo: gray wolves, ravens, and harbor seals (coming in October).

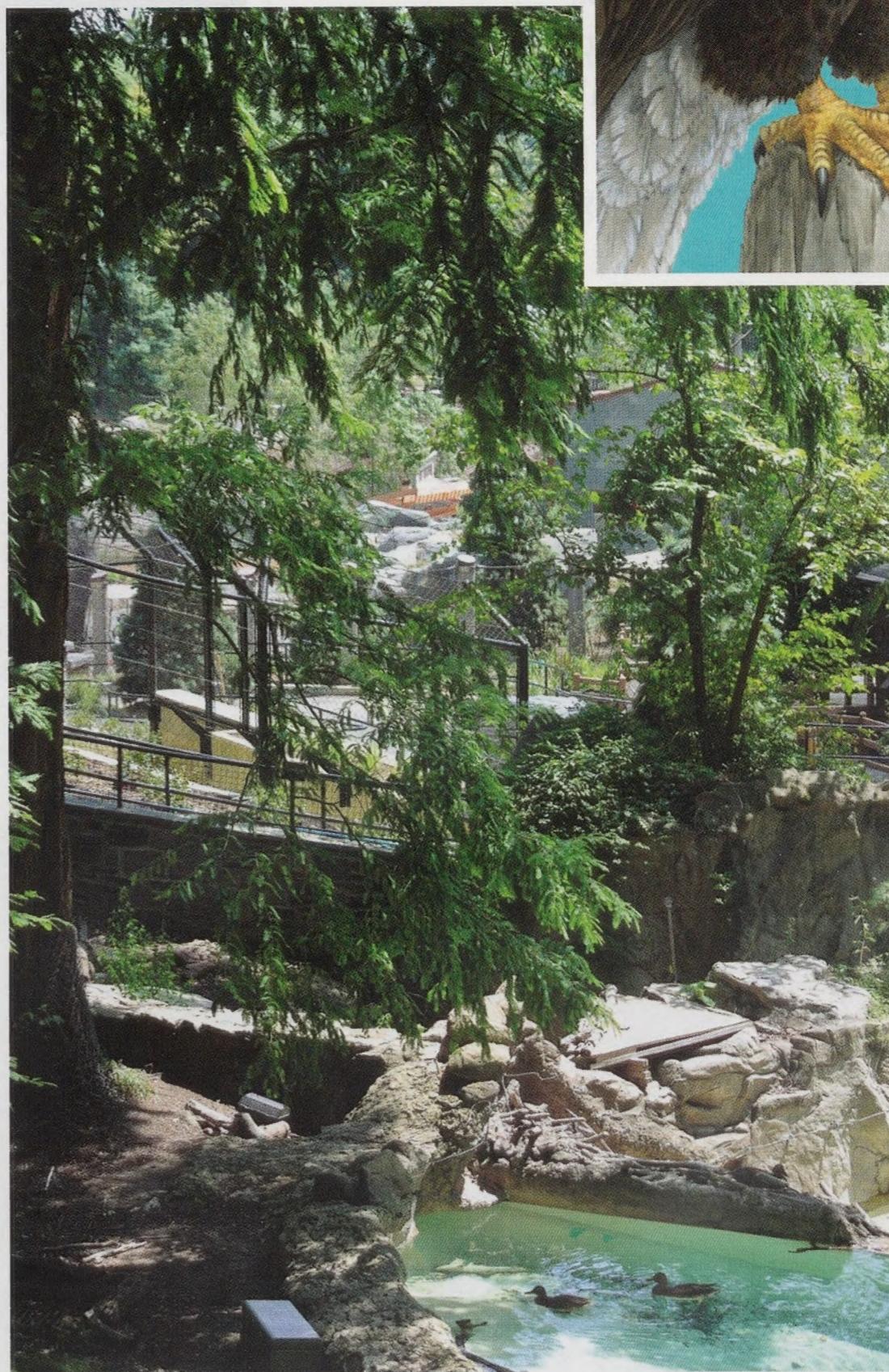
Zoo staff are par-

ticularly excited about the spectacular new pools for our seals and sea lions and the up-close viewing areas. The pools were painstakingly designed to maximize water efficiency while also providing a great environment for the animals. Not only do the new pools constantly recycle water, but their advanced filtration system provides the cleanest water possible for the seals and sea lions.

Visitors to American Trail will also be able to dip their feet into a shallow tide pool and purchase local sustainable seafood at the new Seal Rock Café.



JENNIFER ZOON/NZP



JENNIFER ZOON/NZP



JIM JENKINS/FONZ PHOTO CLUB

## Flamingo Chick Hatches

On July 29, the Zoo celebrated the hatching of a flamingo chick. Keepers are hand-raising the chick and report that it is doing very well. Zoo staff have yet to determine the bird's sex.

Within the next three months, keepers will visually introduce the chick to the Zoo's flock, allowing it to see and be seen by the rest of the group. If all goes well, the chick will then live with the other flamingos.

The Zoo has successfully bred flamingos since 1993, and the new chick is one of more than 60 to hatch here since then.

COURTESY OF WILLIAM LAURANCE



## Global Research on Biodiversity Threats

Two hundred scientists from around the globe contributed to a pioneering study on threats to biodiversity in 60 protected areas in the tropics. Among them was John Seidensticker of the Smithsonian Conservation Biology Institute.

The team's findings, published in a recent issue of *Nature*, show that half the reserves studied were experiencing biodiversity erosion, due primarily to "habitat disruption, hunting, and forest-product exploitation." One of the study's most important findings is that the reserves are affected not just by what goes on inside them, but by their surrounding environments as well. Scientists report that 85 percent of the reserves studied have lost some nearby forest.

The study was supported by James Cook University in Australia and the Smithsonian Tropical Research Institute in Panama. William F. Laurance was the project's organizer and lead author.



CHRISTIAN ZIEGLER/SMITHSONIAN TROPICAL RESEARCH INSTITUTE

## New Tiger in Town

On June 6, the Zoo welcomed the arrival of a ten-year-old Sumatran tiger named Kavi. He came to us from Zoo Atlanta. Born in Ohio, Kavi has also lived in Kansas and North Carolina. Keepers describe the well-traveled tiger as "very calm and even tempered."

Kavi has adjusted well to his new home. He enjoys the panoramic views from atop the outside enclosures in the Great Cats exhibit, and he has settled comfortably into his cave-like indoor enclosure, which Zoo staff constructed to mimic his space in Atlanta.



SMITHSONIAN'S NATIONAL ZOO



BRIAN CANNON/FONZ PHOTO CLUB

## Fishing Cat Kittens on Exhibit

The fishing cats born on May 18 went on exhibit in their Asia Trail enclosure in August. As yet unnamed, the young male and female were the first of their difficult-to-breed species to be born successfully at the Zoo. Initially sharing a yard with their mother, Electra, the kittens will likely be separated from her when they are about six to nine months old. As they mature, they will be paired with genetically suitable mates in the hope of producing a new generation of this endangered species.

## Endangered Cuban Crocodiles Hatch

Two Cuban crocodiles hatched at the Zoo in July. They were the Zoo's first successful hatchlings from this critically endangered species since 1988. Their mother, a 55-year-old wild-born crocodile named Dorothy, had not laid eggs in many years, so the clutch of 26 eggs was a delightful surprise.

Twelve of the eggs were fertile, and Zoo staff carefully incubated them. The temperature of the eggs during incubation determines the sex of Cuban crocodiles, so keepers kept the eggs at about 90°F in an effort to produce males. Males would be a welcome addition to the largely female population in zoos. As the young crocs grow, keepers and veterinarians will be able to verify their sex.

BARBARA WATKINS/NZP





## Cheetah Cubs Named for U.S. Olympians

The Zoo's cheetah cubs, born in May, were given names in August. Since cheetahs are sprinters, Zoo staff, in partnership with USA Track & Field, chose to name the cubs after the fastest American sprinters at the 2012 Olympics in London. Our male cub was named for Justin Gatlin, who took the bronze in the men's 100-meter dash. The female was named for Carmelita Jeter, who won the silver medal in the women's event. The cubs' naming was part of our National Zoo Games campaign, which celebrated our finest animal athletes. Over the course of the Olympics, we used our website and social media platforms to share photos, videos, and animal facts, educating a large, enthusiastic audience about our residents' prowess and the ways that Zoo keepers provide enrichment activities to stimulate animals' minds and bodies. You can learn more at [nationzoo.si.edu/nationalzoogames](http://nationzoo.si.edu/nationalzoogames).



SMITHSONIAN'S NATIONAL ZOO

## National Zoo Mourns Two Beloved Creatures

**T**his past summer, the Smithsonian's National Zoo said painful good-byes to two of its most beloved animals.

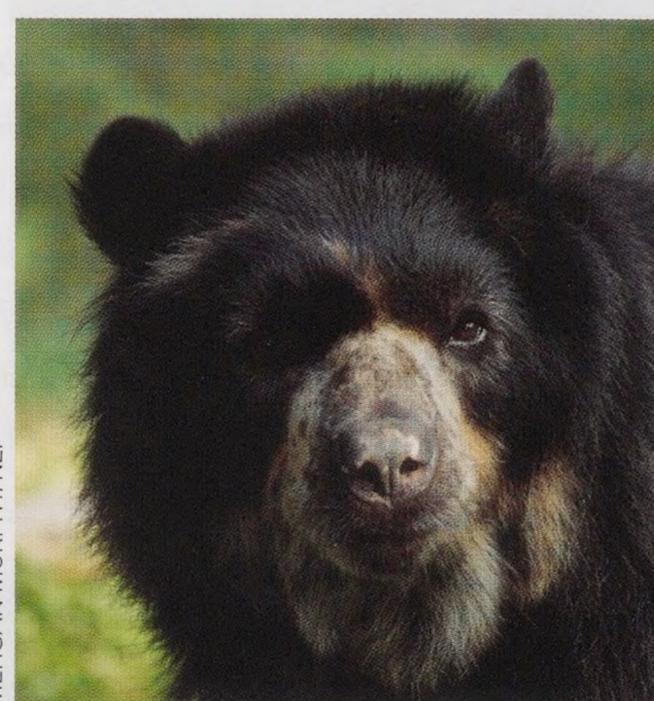
Gunnar, the Zoo's oldest male gray seal, died in June. His health had been declining for several months, and Zoo keepers and veterinarians were keeping a close eye on him. At 38 years old, Gunnar had outlived many other gray seals in human care.

Gunnar came to the Zoo in 1979 after having worked with the Navy for the early part of his life. When he was very young, he was trained to perform tasks such as removing underwater equipment and turning valves.

In early August, Nikki, a male Andean bear, was euthanized as a result of his rapidly declining health due to cancer. He was 20, which is an average life span for an Andean bear in a zoo. When Nikki first arrived at the Zoo five years ago, he was severely overweight. With help from Zoo nutritionists and keepers, he lost 200 pounds during his first year here.

Both Gunnar and Nikki helped propagate their species. Gunnar sired two pups, Kara and Kjia. They will go on exhibit on American Trail later this fall. Nikki sired cubs named Bernardo and Chaska. They were born in 2010. Bernardo has since gone to another zoo, while Chaska remains on exhibit.

MEGAN MURPHY/NZP



MEGAN MURPHY/NZP

## Mark Your Calendar

Sept. 16 **FREE: Fiesta Musical**  
Celebrate Hispanic Heritage Month from 11 a.m. to 5 p.m. by listening to music, watching costumed dancers, buying craft products, and enjoying Latin American food—all at our free festival.

Sept. 20 **Grapes With the Apes**  
Sample fine wines while learning about, and supporting, ape conservation. Learn more at [fonz.org/grapes.htm](http://fonz.org/grapes.htm).

Sept. 27 **Rock-N-Roar** Party like it's 1980 something. Learn more at [fonz.org/rock.htm](http://fonz.org/rock.htm).

Oct. 6-7 **Autumn Conservation Festival in Front Royal**  
See ad on p. 33.

Oct. 26-28 **Boo at the Zoo**  
See ad on inside back cover.

Oct. 30 **Birthday Party Priority Registration Begins**  
[fonz.org/birthdays.htm](http://fonz.org/birthdays.htm).



# driving a brighter future

Ford Motor Company



**Thousands of miles from their native home in China, the giant pandas at the Smithsonian's National Zoo are a symbol for all endangered species.**

**But why would Ford, an automaker, care about pandas?**

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**We like to think Ford is not just in the business of making automobiles. We believe that, together with our partners in the community, we're in the business of driving a brighter future – even for the pandas.**



**Ford Motor Company Fund**

[www.community.ford.com](http://www.community.ford.com)



# Dragons at

Large and lumbering—  
that's how people think of Komodo dragons.  
So it's time for a new look  
at these intelligent animals.

MEGHAN MURPHY/NZP



# Play

BY PHYLLIS MCINTOSH

## When

we think of smart, friendly, playful animals, the Komodo dragon doesn't spring to mind. The largest lizards in existence today, dragons are best known for their prehistoric appearance and unsavory dining habits in the wild. The typical TV image is of lumbering, salivating beasts stalking or devouring hapless prey.

Yet, say researchers and keepers, these lizards are among the most intelligent and inquisitive of all reptiles. They can play like dogs and form strong bonds with the humans who care for them. "In our collective experience with hundreds of other reptile species, no other [group] operates like the Komodo dragon, particularly when interacting with inanimate objects and human caretakers," enthuse the authors of a definitive scientific book on the animals. "Komodo dragons are special!"

This being the Chinese Year of the Dragon, it's an apt time to take a closer look at these awesome creatures and the Smithsonian's National Zoo's special connection to them.

### Powerful Predator in Peril

With the smallest geographic range of any large carnivore, Komodo dragons are, not surprisingly, endangered. Italian researcher Claudio Ciofi, who has been studying dragons in their native Indonesia, estimates that fewer than 3,000 remain in the wild. They exist only on the islands of Komodo, Rinca, Gili Motang, Nusa Kode—all part of Komodo National Park, established in 1980 specifically to protect the dragons—and on Flores, a densely populated island where only some of their habitat lies within two nature reserves.

# Dragons at Play



JESSIE COHEN/NZP

Armed with strong muscles, two-inch claws, and 60 curved, serrated teeth, Komodo dragons are powerful predators. They are content to lie in wait for hours to ambush a passing deer, boar, or goat, which they often kill outright. Wounded prey that manages to escape is equally doomed, because the dragon has yet another weapon in its arsenal—a particularly toxic bite. Scientists have identified 57 different kinds of bacteria in dragons' saliva, almost all of them capable of causing infection.

In 2009, Australian researchers discovered that dragons also produce a venom that prevents blood clotting and lowers blood pressure, causing a bitten animal

to go into shock. The combined effects of venom and infection eventually weaken and kill the prey. Dragons, like snakes, use their forked tongues to "smell" the environment and home in on the carcass, even up to six miles away.

Komodo dragons are remarkably efficient eating machines. Nothing is wasted. Bones, hooves, hides, intestines—all are part of the meal. Jim Murphy, acting curator of reptiles at the Zoo, describes a group of dragons in Indonesia feeding on a goat carcass that had been tossed to them at a ranger station. "It was seven minutes from the time the carcass hit the ground until there wasn't a scrap of goat left, not even a horn," he recalls.

## Docile Dragons in Zoos

The behavior of dragons in human care belies this fearsome image. Exhibited in zoos since 1926, they have had some amazingly cozy relationships with keepers and zoogoers alike. Just weeks after arriving at the London Zoo in the late 1920s, a dragon named Sumbawa was the guest of honor at children's tea parties and was photographed next to a two-year-old child. Even in the 1960s, an adult dragon strolled with its keeper among visitors at the Frankfurt Zoo in Germany.

Unfortunately, these wild-caught dragons did not fare well or breed in zoos, because staff knew little about their biology and how to manage them. Between 1934

## DRAGON DETAILS

- The largest dragon on record was more than 10 feet long and tipped the scale at 366 pounds, though scientists suspect a recent meal may have accounted for much of the heft. Large wild dragons typically weigh about 150 pounds.
- Parthenogenesis, “virgin” hatching of eggs without fertilization by a male, has been documented among dragons at several zoos in the United States and England.
- Dragons can run briefly at speeds up to 13 miles an hour. When threatened, they can throw up the contents of their stomach in order to reduce their weight and flee faster.
- Dragons eat almost any kind of meat, including carrion, and hunt animals ranging from small rodents to large water buffalo.
- Before eating a prey animal's intestines, dragons swing them vigorously to remove feces. Young dragons, preyed upon by adults, often roll in feces to make themselves unappetizing.
- Dragons bitten by other dragons during combat are unaffected by the toxins that kill their prey. Scientists are studying antibodies in the animals' blood to determine why they are immune.
- Wild dragons' diet of carrion may account for the large variety of bacteria in their saliva. Dragons in zoos harbor far fewer bacteria.

Komodo dragons hatched at the National Zoo—the first place outside of Indonesia to breed them—in 1992

and 1975, the National Zoo exhibited five dragons; they lived an average of only five years. By the 1990s, however, Komodo dragon fortunes were about to change dramatically—and the Zoo would play a key role.

### The Zoo Makes History

In 1988, the Zoo received two dragons as a state gift from Indonesian President Suharto to President Reagan. The reptile curator at the time, Dale Marcellini, wisely requested young animals, thinking they would do better in a zoo setting. He was right. In 1992, the animals bred, and the Zoo made history as the first outside of Indonesia to hatch Komodo dragon eggs.

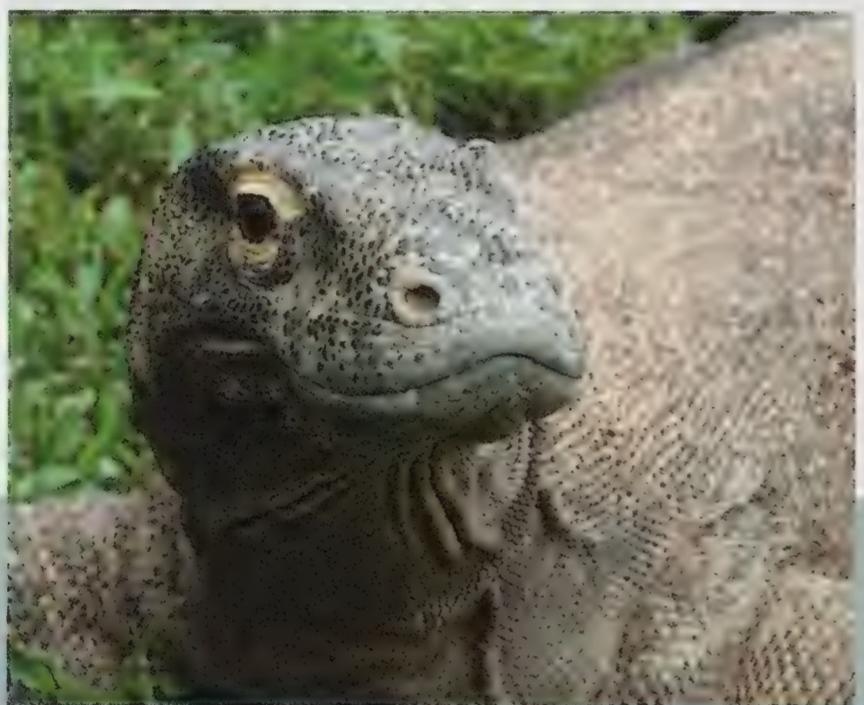


The Zoo first exhibited a Komodo dragon in 1934.

NATIONAL ZOO PHOTO ARCHIVE

# Dragons at Play

MEGAN MURPHY/NZP



## Meet Murphy

The Zoo currently exhibits one Komodo dragon, a 14-year-old male named Murphy in honor of Jim Murphy, acting curator of reptiles. Hatched at the Miami Zoo, he arrived at the National Zoo when less than a year old and weighing just over two pounds. At his last checkup, he weighed in at 150 pounds and measured more than eight feet long.

His sleek figure is the result of a recent stint on the Zoo's equivalent of Weight Watchers. "Komodos in captivity tend to become obese if you aren't real careful with their diet, because they are very food oriented," says Janis Gerrits, Murphy's keeper since 2005. "He would eat as much as you gave him until there was no more room. We've had to trim him down." That means fewer of those yummy rats, mice, and rabbits.

Murphy holds court in his three enclosures located behind the Invertebrate Exhibit. Two indoor

"When the female, Sabat, laid 26 eggs, we split the clutch and sent half to a researcher at George Mason University [in nearby Virginia], because we couldn't maintain all of them with the incubators we had," explains Trooper Walsh, who was a Zoo biologist and dragon keeper at the time. "We also set them at different incubation temperatures, because no one had any idea what the proper temperatures were."

In the end, 17 eggs hatched. Over the next three years, Sabat laid three more clutches, two during a breeding visit to the Cincinnati Zoo, and another at the National Zoo. In all, she produced 55 offspring, which were sent to more than 30 zoos around the world, some hand-delivered by the proud Walsh himself.

rooms, one with a pool, are kept at a toasty 100 degrees. In hot weather, he can be seen basking in his grassy outdoor yard. Alas, he will not be sharing his digs with a girlfriend, says Jim Murphy. The lizard's role is as an ambassador to educate Zoo visitors about his endangered species.

According to Gerrits, her charge is curious, always interested in new smells and new people, and an "unusually nice" animal. "In the morning when I go in to clean," she says, "he knows if he comes and stands by me I'll give him a back rub with his bath brush." She does not allow him to climb on her or remove items from her pocket. And at feeding time, to be safe, Gerrits stays outside because "he's looking for food, he's very alert, and his movements are fast."

When Murphy was smaller, Gerrits used to simply pick him up and place him where she wanted. As he grew bigger, she trained him to move elsewhere in the enclosures or to enter a crate for his vet exam. Overall, she says, "he's like a big Labrador retriever, very friendly and easygoing—as long as there isn't food around."

One of the first hatchlings from 1992, a female named Kraken, went on to make news of her own. When Kraken was about three years old, staff were struck by her playfulness and her close bond with Walsh. She would come when he whistled, snatch a handkerchief or notebook from his pocket, scrape his shoes with her forearm, play tug-of-war with a soda can, and interact with empty cardboard boxes, scarves, and pieces of cloth. She even stood on her hind legs, directed tongue flicks to Walsh's face, rested her head on his shoulder, and closed her eyes!

These observations led to a fascinating landmark study by Gordon Burghardt, professor of psychology and ecology and evolutionary biology at the University of Tennessee, Knoxville. Burghardt analyzed 31 videotaped sessions over a two year period during which a variety of objects—a rubber ring, tennis shoe, Frisbee, notebook, a pail filled with paper towels—were placed in Kraken's enclosure. Some were scented, some not. Sometimes a human, usually Walsh, also was present.

"She was interested in all the objects and liked to play with them, which you don't necessarily expect from a reptile," Burghardt says. "The only time we saw swallowing movements was if an object had a food scent like blood or linseed oil, which is thought to mimic the smell of animal skins. Otherwise, she just manipulated the objects. It was much like a dog fetching an item. He knows to retrieve it but not eat it." Her interest in Walsh varied with her mood and the object in her enclosure, Burghardt notes.

Kraken is the only dragon studied that extensively so far, but Burghardt is about to begin observations of a young dragon at the Knoxville Zoo. It is similarly alert and friendly and, he says, "looks like a miniature Kraken."

Not all dragons are as accommodating, however. As in many species, individuals have distinct personalities, and some hatch with an attitude. "We had one or two dragons that were like sharks right out of the egg," Walsh says. "I was sent to the hospital twice because of nips from yearling dragons. They can do some damage right from the start."

## Conserving Dragons

Currently, 119 dragons reside at 50 zoos within the United States. Some 10 zoos have successfully bred them. Although the National Zoo has no immediate plans for further breeding, experience with previous hatches has proved invaluable. "Over the years, we were able to refine the temperature and humidity formula," says Walsh. "Information gleaned from breeding dragons also has been successfully applied to other monitor lizards, which had not bred with regularity prior to that."

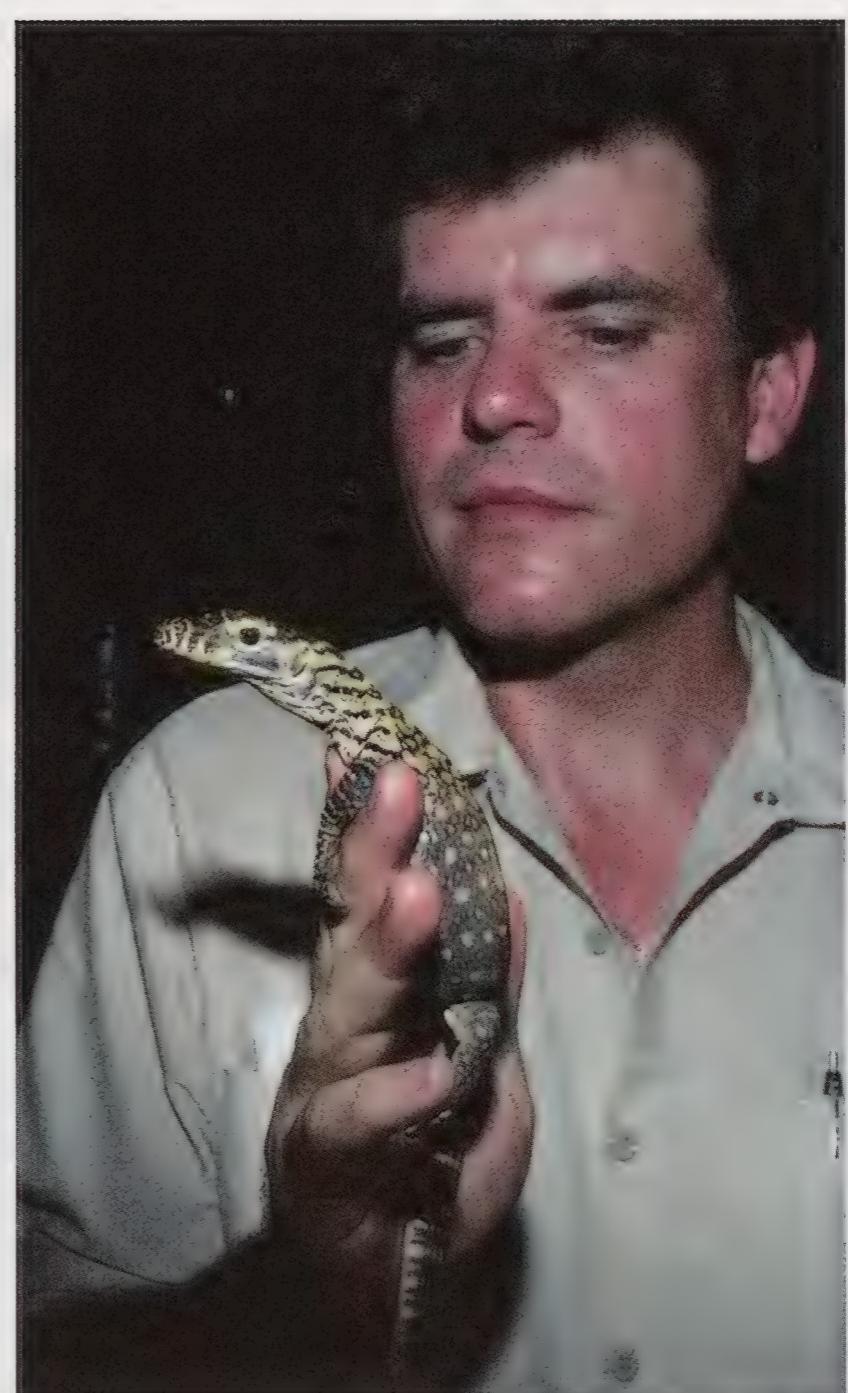
The genetic diversity of the zoo population is still above 90 percent, reports Don Boyer, a curator at the Bronx Zoo and coordinator of the Komodo dragon Species Survival Plan (SSP), which supervises breeding in zoo populations. New bloodlines occasionally enter the mix when the U.S. Fish and Wildlife Service confiscates illegally shipped dragons or zoos arrange exchanges. But within the next decade, Boyer says, it will probably be necessary to acquire dragons from Indonesian zoos, a complicated process that may require government-to-government

negotiations and perhaps an Indonesian presidential decree.

To help conserve dragons in the wild, the SSP manages a conservation fund—as the National Zoo has also done in the past—that supports field research in Indonesia. Especially on the populous island of Flores, dragons are gravely threatened by slash-and-burn agriculture and poaching of deer, their main prey. Educating and involving local people in protecting dragons are key to the lizards' long-term survival, maintains researcher Claudio Ciofi.

Clearly one of nature's most fascinating creatures, Komodo dragons have earned the admiration of those who have worked with them. "If you look at a dragon, what is really striking is that it looks back at you," says curator Jim Murphy. "Reptiles just don't do this! I don't know of any other reptile in my experience that has shown the intelligence of dragons. They're just a different beast." **SZ**

—*Veteran contributor PHYLLIS MCINTOSH is a longtime Zoo volunteer.*



JESSIE COHEN/NZP

TOP: Trooper Walsh was a Zoo biologist and Komodo dragon keeper when our first hatchlings emerged in 1992.

BOTTOM: Komodo dragons have lived on Earth for roughly 100 million years, but scientists only began studying them about a century ago.



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# visual aids

BY KATRINA DEPTULA

PERU25

## Where are the animals?

That's a question conservation biologists must answer before they can study, let alone save, creatures in the wild. It sounds like a simple query, but it's not. Many animals are elusive, hiding from predators or waiting to ambush prey. Finding them can be a tremendous challenge.

"We used to walk through the woods and look for feces and tracks and try to figure out what animal it was," says William McShea, a research ecologist at the Smithsonian Conservation Biology Institute (SCBI). "There's a lot of guessing involved. We still do that to some extent, but it's

better to stick a camera trap in the woods and see what walks down it."

Simple as it sounds, placing camera traps in a habitat has become one of the great breakthroughs in wildlife research. Camera traps, which detect an animal's presence and then capture its image, provide researchers with hard, visual data about wildlife populations. Over the past two decades, these invaluable tools have led to the rediscovery of the hairy-nosed otter in Malaysia; confirmed the presence, 62 years after the last sighting, of the Amur leopard in China; and introduced scientists to new species, such as the grey-faced sengi, a type of elephant shrew, in Tanzania.

# A humble device known as the camera trap has revolutionized wildlife research and conservation.



## New Twists on an Old Tool

Here are the ingredients for a successful camera trap: one part digital camera, one part infrared sensor that detects heat and movement, and one part infrared flash. Attach the unit to a tree or post about two feet off the ground, turn on, and walk away. Let sit for one to six weeks. Collect and enjoy your photos.

Camera traps can photograph animals as small as mice and as big as elephants. They work around the clock and don't scare away wary animals the way the presence of a human would. Another benefit of camera traps is their relatively low cost. A single unit runs about \$100 to \$600 plus the cost of batteries, chargers, and memory cards.

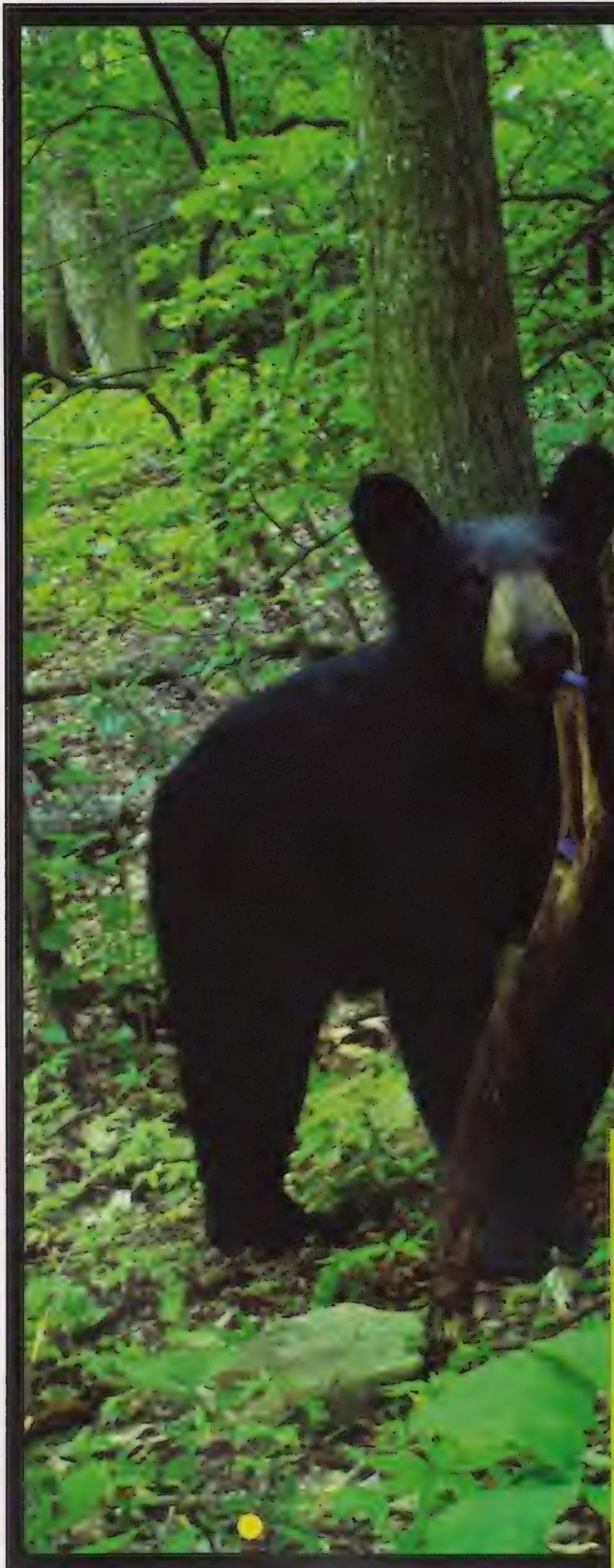
The camera trap, says McShea, is "just a variation on an old idea." He's been using camera traps for the past 20 years. The technology dates back to the 1880s, when George Shiras, a congressman and conservationist, used

trip wires and remote-control flashbulb film cameras to photograph deer and other wildlife in Michigan. His images later became the first wildlife photos ever to appear in *National Geographic*. In the 1920s, ornithologist Frank M. Chapman became the first to use camera traps for purely scientific purposes when he photographed species on Barro Colorado Island in Panama.

As late as the 1980s, camera traps were still a far cry from those used today. The technology back then consisted of 8mm movie cameras run by car batteries and triggered by pressure mats. The 1990s saw the introduction of commercial wildlife camera traps and infrared flashes. Much less noticeable than a standard flash, an infrared flash is less likely to startle any critter that might happen by.

Today, camera traps have gone digital like the rest of the world, and the practice of studying wildlife with them

## Visual Aids



## Wild Websites

Camera traps have become powerful tools for raising global awareness of conservation issues. Scientists, conservationists, and citizens post images and videos online to draw attention to threatened species. The Internet's largest repository of camera trap images is Smithsonian Wild ([siwild.si.edu](http://siwild.si.edu)), a collection of 200,000 photos captured by devices stationed anywhere from Asia to the Adirondacks.

Awesome as Smithsonian Wild is, though, Smithsonian scientists William McShea and Robert Costello have an even grander vision in mind. With support from the National Science Foundation, they're creating a new site, to be called eMammal. This expanded resource will allow both scientists and volunteers to upload images and analyze data.

has exploded. Hundreds of studies are under way, from urban parks to the most remote jungles.

### Important Advantages

Equipped with camera traps, researchers are gathering an array of data, including species presence and distribution, population numbers, animal condition and behavior, seasonal fluctuations in species and numbers, cohabitation of species, nest ecology, habitat use, and activity period.

"Camera trapping is better than other methods because it's noninvasive. It doesn't involve handling the animals, which can cause them stress and change their behavior. You can get a lot of information about animals through this method that you can't get with other methods. I think that's the number-one reason why camera trapping is good for conservation," says Megan Baker of the Conservation Ecology Center at SCBI. In pursuit of her master's degree,

she is doing camera trap research on small carnivores in Thailand.

Other advantages of camera traps include continuous and silent operation, certain identification of species in an area, cost and time effectiveness, and repeatability. Depending on battery life and memory card size, these cameras can be left at a site for up to six months. Information collected can tell scientists which prints and scats go with which species or



DLCcovert.com

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Depending on battery life and memory card size, these cameras can be left for up to six months. Information collected can teach scientists what prints and scats go with which species or provide a research basis for management and policy decisions.

## Visual Aids



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This fall, Smithsonian Conservation Biology Institute scientists will begin a new project on local wildlife. "What we're hoping to do," says researcher Megan Baker, "is to find out a way to do population estimates through a big algorithm process." Data for the project will come from camera traps near both Washington and Front Royal. Volunteers are needed to maintain the cameras. To learn more or sign up, please contact Baker at [bakermc@si.edu](mailto:bakermc@si.edu).

provide a research basis for management and policy decisions. Not to mention that camera traps are easy to use, interesting, and fun. That leads to an innovation that McShea pioneered.

### Contributions to Conservation

McShea added a new ingredient to the camera trap recipe: citizen scientists. He came up with the idea to pair the devices with volunteers back in 1998 while training reserve staff to study black bears and takin in China. Here in the United States, he recruited more than 60 volunteers to

agency has enough money to hire enough staff to do everything. We need to rely on interested parties to help us. I can't have 20 staff, but I can have 20 citizen scientists. And that makes a big difference to me.

"Here are people who want to get involved, and conservation is just not saving rhinos in Africa or tigers in India. There are conservation issues at home, and the more we get people involved in those conservation issues, the more motivated they will be to do something. So it provides a venue for them to get excited about something and to find like-minded people to get

slide show of bears eating the cameras," he recalls. "They love to come to a camera and eat it up. What would happen sometimes, a claw would go through where the lens was, and maybe press the lens out and let water in." To prevent that, the Smithsonian provides its citizen scientists with "bear boxes," or steel cases that prevent animals from completely destroying the devices.

Bears aren't the only creatures to take an interest in camera traps. Now and then, McShea reports, human hikers will come across one of the devices. "The funniest feature of the project," he says, "is looking at photo-



monitor cameras at 796 sites along the Appalachian Trail.

Among those volunteers was Ben Shrader, an engineer and land surveyor in Bedford, Virginia. In 2007, he saw an article in the *Roanoke Times* about the need for volunteers to conduct a predator survey on the Trail. The possibility caught his eye. "I'm a lifelong outdoorsman," he says. "Seeing volunteers needed for something that would be an excuse to get me out on a regular basis was attractive." Since then, camera trapping has become a hobby for Shrader, who now owns eight functioning camera traps.

Using citizen scientists, says McShea, "is a win-win for everybody. First is that I personally cannot go every place and do everything. And no federal, state, government

excited with. They find other volunteers and exchange stories, and they exchange conservation attitudes. And it helps. It helps a lot."

### Technological Travails

Just like any other technology, camera traps have their pitfalls. Since the cameras are left exposed to the elements, there are many opportunities for failure. Camera trap operators worry about battery life, memory card functionality, durability of the weatherproof housing, and of course interference from the animals themselves. "It depends on the personalities of the animals," says McShea. "The bears and the elephants definitely mess up the cameras."

Shrader had his own experience with bear tampering as well. "I put together a little

graphs of humans who discover the camera traps. Must folks seem to be unaware of what the camera is doing. They look at the camera and cock their head and rub their chin and discuss with their partners—all while the camera is busy recording their actions. Many sequences of photographs would win the prize on *America's Funniest Videos*."

Setbacks should not deter anyone from volunteering. Shrader counsels, "The main advice I'd give someone wanting to become a volunteer is 'Don't be afraid.' This is not anything to be scared of." And who knows what one citizen scientist can discover? **SZ**

—KATRINA DEPTULA, former intern on the Zoo's communications team, is a student at American University.



**As Earth grows warmer, forests become increasingly important. Smithsonian scientists are exploring how.**

**A**t first, it seems like any other Virginia forest in autumn. The cicadas' maraca-like whirring has ceased at last, replaced by the crackle of leaves on the forest floor. Beneath the sun, the fiery hues of the tree canopy flash together. A red fox flits past a red oak, barely visible in the orange underbrush.

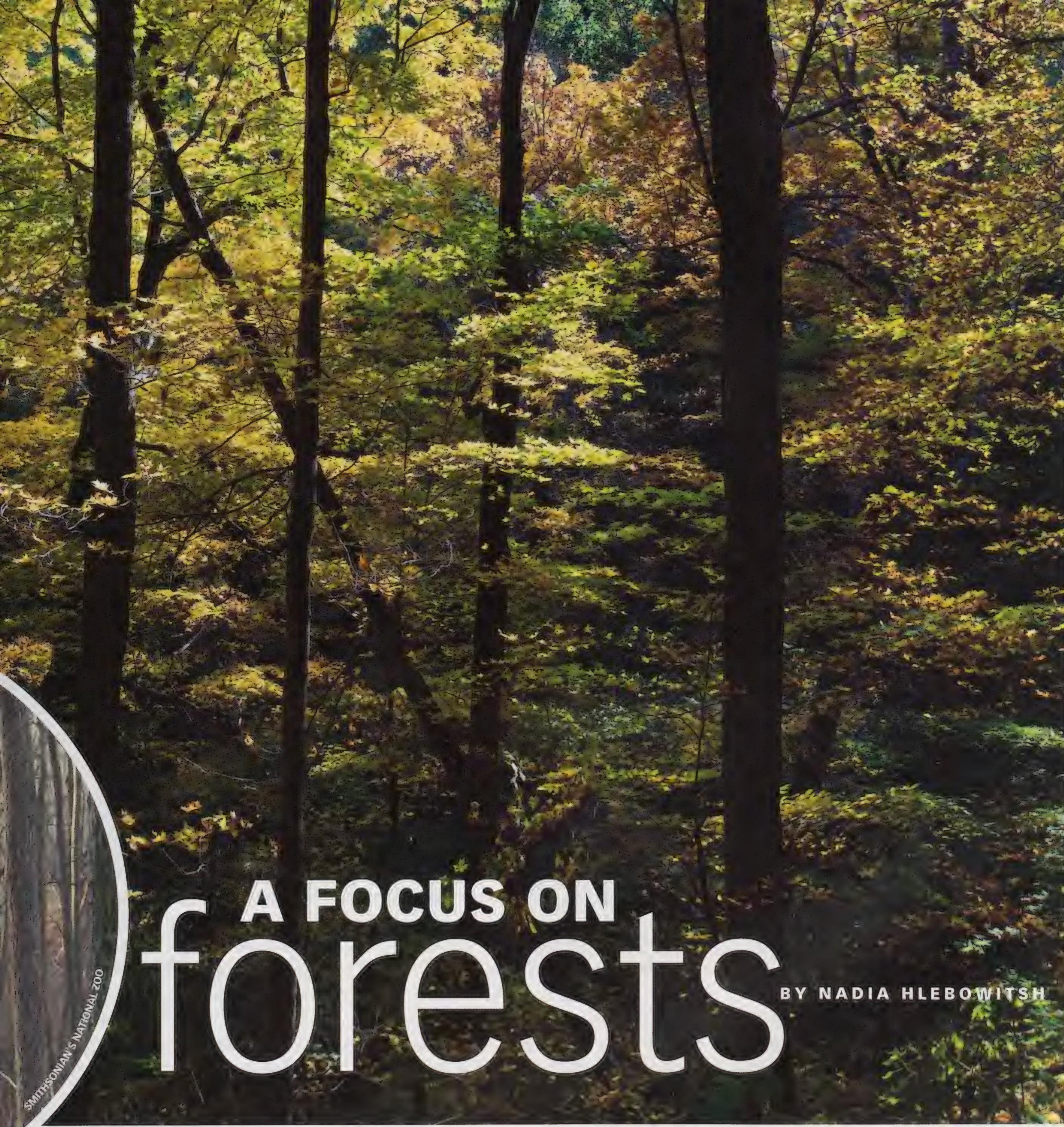
A sharp eye reveals, though, that this is no ordinary forest. Each tree trunk bears an aluminum tag with a unique number, the metal glimmering silver among the golden surroundings. The tags date from 2008, when a team of Smithsonian scientists trudged through the woods, recording the location, size, and species of every plant larger than one centimeter in diameter. (The next survey will take place in 2013.)

This much-measured forest, a 26-hectare plot containing 40,180 individually identified woody stems, stands on the grounds of the Smithsonian Conservation Biology Institute (SCBI) headquarters in Front Royal, Virginia. It is one of 47 such plots in 21 countries around the globe. Each woodland tract is part of the Smithsonian Institute Global Earth

Observatories (SIGEO) project, an effort to chart the effect of global climate change on forests and their inhabitants. Worldwide, scientists are monitoring the survival and growth of more than 4.5 million trees and 8,500 species.

#### **A "Telescope" Among the Trees**

Over the next year, something new will rise in the Front Royal forest: a 170-foot-high tower. Soaring above the treetops, it will support sophisticated instruments that can monitor exchanges of carbon dioxide



# A FOCUS ON forests

BY NADIA HLEBOWITSH

SMITHSONIAN'S NATIONAL ZOO

GERRY BISHOP/VISUALS UNLIMITED, INC.

and other gases between the forest canopy and the atmosphere, and record evapotranspiration and temperature changes in the forest. Instruments in the soil will measure the production of carbon dioxide by organisms in the ground. Project staff working nearby will identify disease-carrying mosquitoes and monitor plants and animals.

The tower marks the forest's participation in yet another pioneering research endeavor: the National Ecological Observatory Network (NEON). The project is the first time ecologists have attempted to

collect large-scale, nationally standardized data on the ecological conditions of natural habitats. NEON scientists will make their data and analyses available online so that they will be accessible to the widest possible audience.

Sixty sites, each equipped with a similar tower and suite of monitoring protocols, will provide information on different "eco-climatic domains" across the United States. The Front Royal site represents the mid-Atlantic region. NEON will add four people—an ecologist and three technicians—to the Front Royal site.

"We often compare NEON to the Hubble Space Telescope," says Bill McShea, research ecologist and head of NEON tower construction at Front Royal. "The continental scope of our project is its ecological equivalent. With the construction of the NEON tower, we will be able to collect the same data at the same time across the country. It's an extensive research tool in the same way the telescope is."

## The Carbon Connection

Above all, the NEON tower will measure the impact of global change through one

# A FOCUS ON forests

important element: carbon. Found in every living organism—and various nonliving things, most notably fossil fuels—carbon is a key ingredient in global climate change. In the atmosphere, carbon is present in the form of carbon dioxide ( $\text{CO}_2$ ), a gas that traps heat.

Carbon dioxide is crucial to understanding how our climate is changing. According to scientists studying air bubbles in ice cores, total atmospheric carbon dioxide was stable for several thousand years. Since the Industrial Revolution began around 1750, however, the amount of carbon dioxide in the atmosphere has increased from 280 parts per million to nearly 400 parts per million today. Much of this increase, scientists believe, is the result of human activities, specifically the burning of fossil fuels and deforestation.

How this connects to forests is that plants, through photosynthesis, absorb  $\text{CO}_2$  from the atmosphere. Earth's temperate forests—such as the one at Front Royal—currently absorb anywhere from 15 to 40 percent of fossil fuel emissions. That's one reason why scientists refer to these forests as "carbon sinks."

What happens next depends on the age of the forest. Young forests, like teenagers, consume lots of food as they grow. They actively convert carbon from  $\text{CO}_2$  into the carbohydrates in their tissues. Older forests, on the other hand, tend to have a rough balance between carbon uptake by living trees and carbon release by dead ones as they decompose. A forest that takes up more carbon from the atmosphere than it releases is said to sequester carbon.

## Creative Challenges

Understanding forests' role in carbon sequestration is the focus of a third Smithsonian undertaking, the Global Forest Carbon Research Initiative. Launched in

## DID YOU KNOW

**T**rees' role in storing carbon is far from their only service to the planet and its occupants. Forests also shelter biodiversity, filter air and water, provide important products, and give humankind some of its best recreational spaces.

2008, the project focuses on carbon storage by temperate and tropical forests. Scientists collect carbon data at 18 sites around the world, using protocols developed by a group of experts:

Gathering those data has required ingenuity. For example, Smithsonian technicians developed a new tool called the " penetrometer." It measures how easily a tree breaks into dead wood, telling scientists how decayed or dense the tree is. Other important tools are dendrometers (which measure incremental changes in a tree's circumference) and litter traps (which collect leaves, flowers, and fruits that fall from the tree).

Another occasion for innovation was the deployment of litter traps at a site where elephants dwell in India. "Our collaborators there took one look at the aboveground litter trap design and said it would never work at that site. The elephants would just destroy the traps," says Helene Muller-Landau, lead scientist for the initiative. "So they developed an alternative trap design that involved a concrete trap base that was elephant-proof."

Temperate forests posed challenges too. Some sites had trees with deep furrows, which allowed a dendrometer (generally a metal or plastic strip) to slip from around

the trunk. Researchers at these places built clips to hold the dendrometer in place.

All these innovative instruments are crucial for measuring tree growth and drawing conclusions about carbon storage in forests. One of the most important questions the Global Forest Carbon Research Initiative seeks to answer is whether forest growth is increasing and, if so, why. Possible factors include higher levels of  $\text{CO}_2$ , changing climates, and the effects of human actions.

Under laboratory conditions, higher  $\text{CO}_2$  leads to greater plant growth. In nature, however, things are more complicated. Plant growth may be limited by soil quality and the presence of plant-eating animals, among other factors. The growth of individual plants, moreover, may not translate into greater carbon storage at the forest level.

## Life in a Warming World

Global climate change is thought to have highly variable effects on forests, depending on historical climates and regional changes. Rising temperatures are increasing the length of the growing season in many temperate and boreal forests. Yet warmer weather can have negative effects as well (see sidebar).

Pinpointing how increasing atmospheric  $\text{CO}_2$ , changing climates, and other anthropogenic influences affect forests' storage of carbon is exceedingly difficult. There is tremendous natural variation in carbon storage and productivity among forests, and effects are expected to be proportionally small. (Over time and area, however, the effects add up to be of great global significance).

What is clear is that insofar as forest carbon stores are increasing, they are slowing the increase in atmospheric  $\text{CO}_2$ . And it is also generally agreed that temperate forests are currently a large carbon sink. Whether this is purely because of recovery from historical deforestation or also reflects atmospheric and climate change remains hotly debated.

"In the tropics the data are less clear, but the evidence increasingly points toward increasing carbon stores in old-growth tropical forests as a whole, although the

## Woodland Woes

Rising global temperatures pose varied threats to forests. Warmer winters allow insect pests to survive and menace vegetation. Changing climates can also leave forests drier, stressing trees and making wildfires more frequent and destructive. Finally, higher temperatures appear to be increasing the frequency of hurricanes and other extreme storms that can damage forests and thereby decrease carbon stores.



MEHGIAN MURPHY/NZP

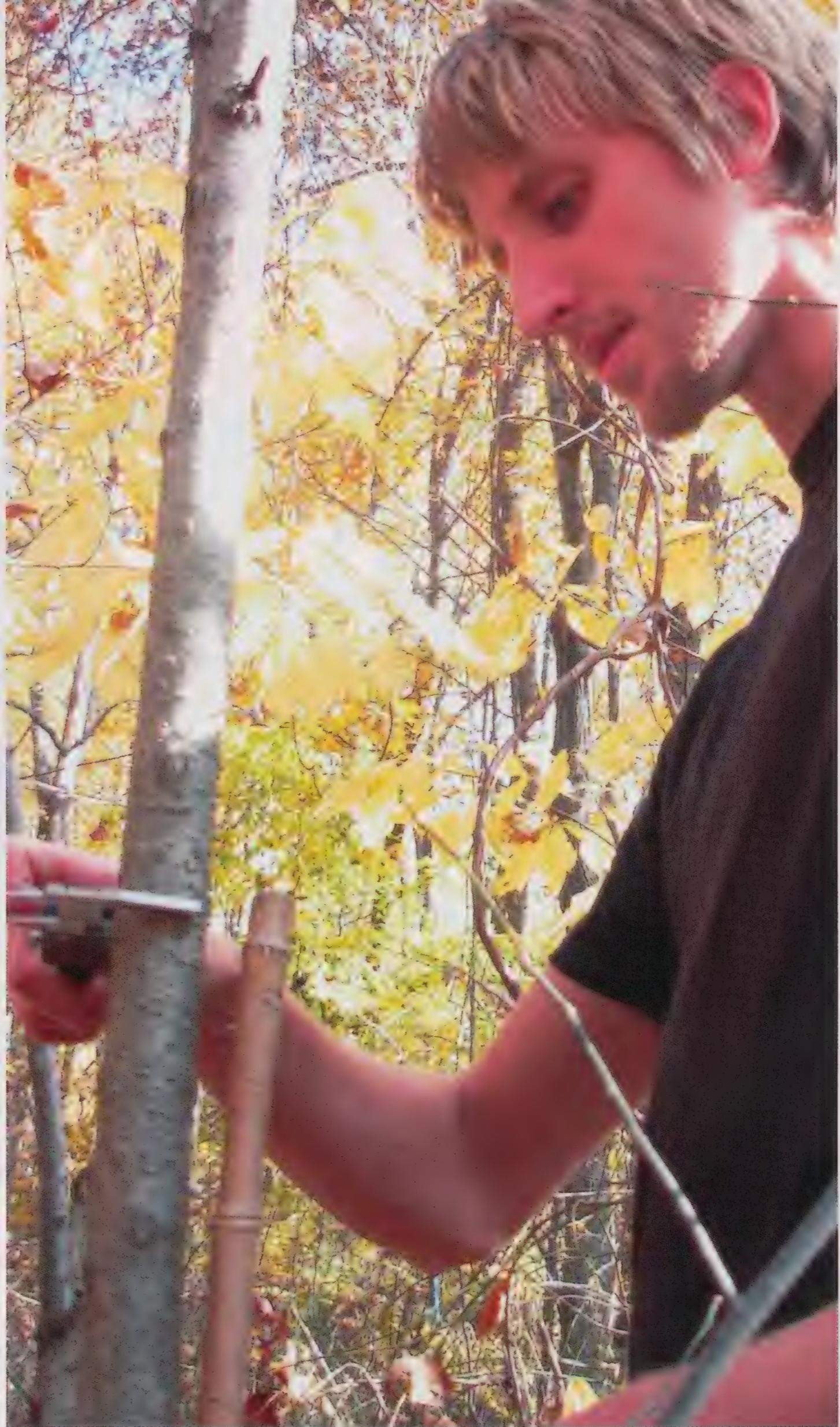


SMITHSONIAN'S NATIONAL ZOO

TOP: Bill McShea is a research ecologist at the Zoo's Front Royal campus.

ABOVE: Researchers erect a litter trap, which collects leaves, fruits, and flowers that fall from the trees.

RIGHT: Intern Lawrence Barringer measures a pawpaw tree.



SMITHSONIAN'S NATIONAL ZOO

magnitude and causes of this increase continue to be much debated," says Muller-Landau. "The patterns will no doubt turn out to vary from region to region, depending on variation in changes in precipitation and temperature, as well as on nitrogen deposition and soils."

### Forests in Our Future

How will global climate change affect forests? Among the scientists tackling that tricky question is SCBI forest ecologist Jonathan Thompson. He studies indirect impacts of climate and land use change on temperate forests. Using research modeling to predict various scenarios, Thompson thinks about the long-term "what if" possibilities.

One of his current projects involves measuring the carbon sink of New England forests that have not been cleared for farmland. Farmland does not store nearly

as much carbon as forests. Not only is there minimal aboveground foliage, but farming disturbs the soil, and direct sunlight accelerates decomposition.

"Because Europeans cut down 99 percent of the primary forest when they came here, we don't really know when the current trees will stop sequestering carbon," says Thompson. "Eventually the forest will stop doing it, but we don't know how long it will go on, and we don't know how much carbon they'll store between now and then. So, I'm going to that one percent of forest that didn't get cut down, and I'm measuring the carbon stores there and saying, 'Oh these are probably the upper bounds of what we can expect from these young trees as they grow.'"

A key factor in Thompson's scenarios is how humankind responds to climate change over the next 50 years. In one

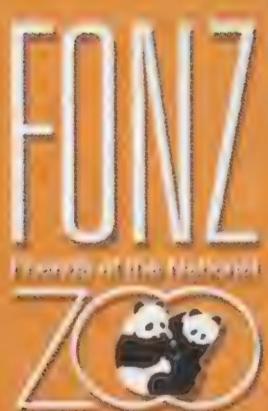
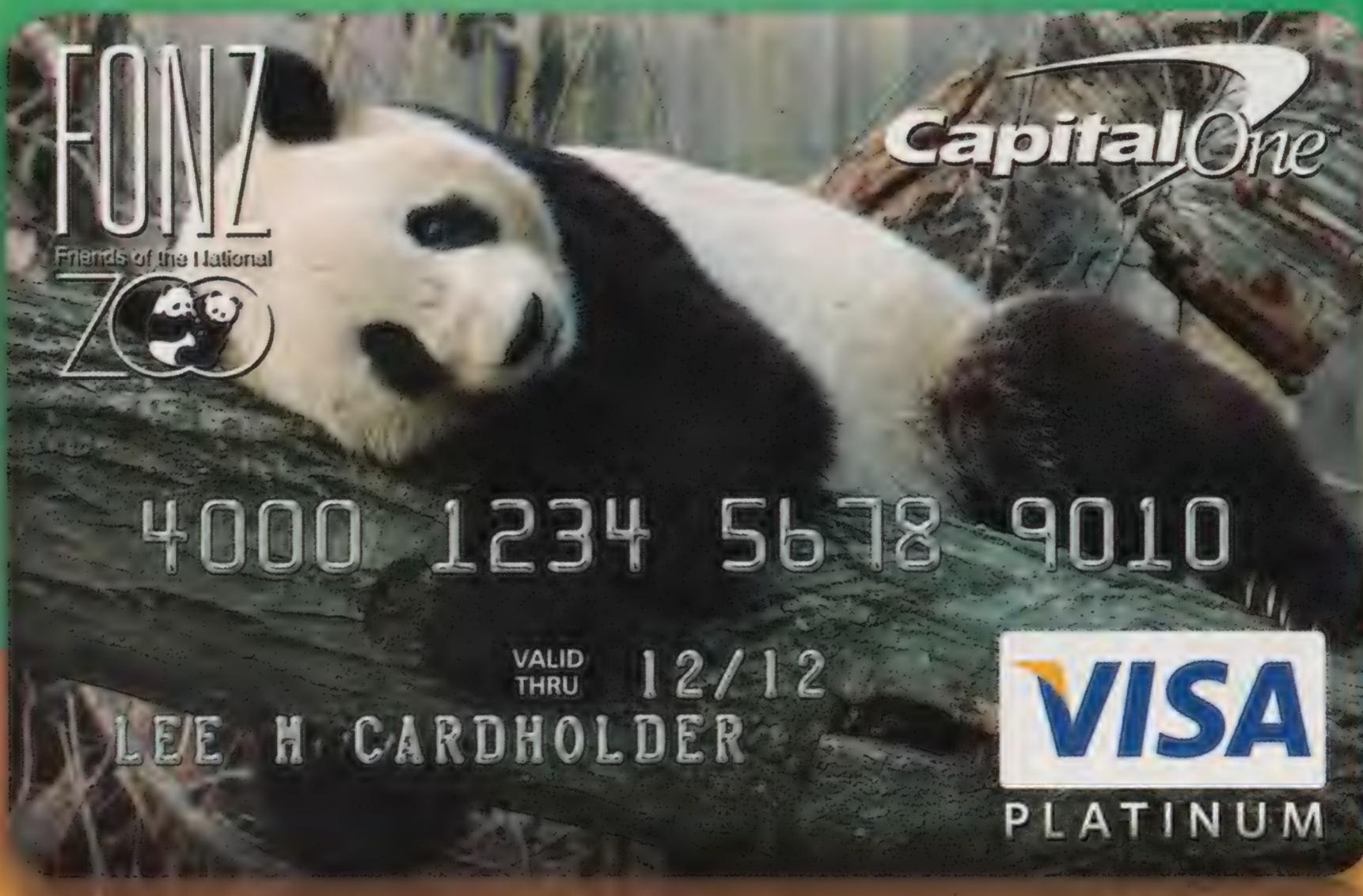
possible scenario, fossil fuel prices increase in response to resource scarcity. In turn, people begin burning wood for biofuel, creating a larger indirect effect on forests than the direct effects of climate change.

A vital thread links Thompson's work to that of SIGEO and NEON and the Global Forest Carbon Research Initiative. That is the quest for thorough, accurate data that scientists, policymakers, and landowners need to make informed environmental decisions over the coming years. "I would hope," says Muller-Landau, "that as we get an ever clearer picture of the magnitude of climate change and its effects, we as a society will make better choices about what to do about it." SZ

—NADIA HLEBOWITSH, a former intern on the Zoo's communications team, is a student at Northwestern University.

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BEAST BITS



JESSIE COHEN/NZP

improve bulletproof vests and body armor. *You can see an arapaima in the Amazonia exhibit.*

**Amazonian Armor**

Most animals steer clear of the fierce piranha and its razor-sharp teeth. But the arapaima, one of Earth's largest freshwater fish, has no worries. That's because triangular scales cover its body. They're made of a tough material that cracks a piranha's teeth. Scientists study arapaima scales for ideas on how to

**Standing Guard**

Meerkats are African mammals that live underground. They dwell in groups called mobs. During the day, meerkats head aboveground to search for tasty insects and other food. That exposes them to danger. So mob members take turns watching out for predators. When the sentry, or guard, sees danger, it lets out a special call. That tells the mob to scramble underground and seek safety. *You can spot meerkats at the Small Mammal House.*



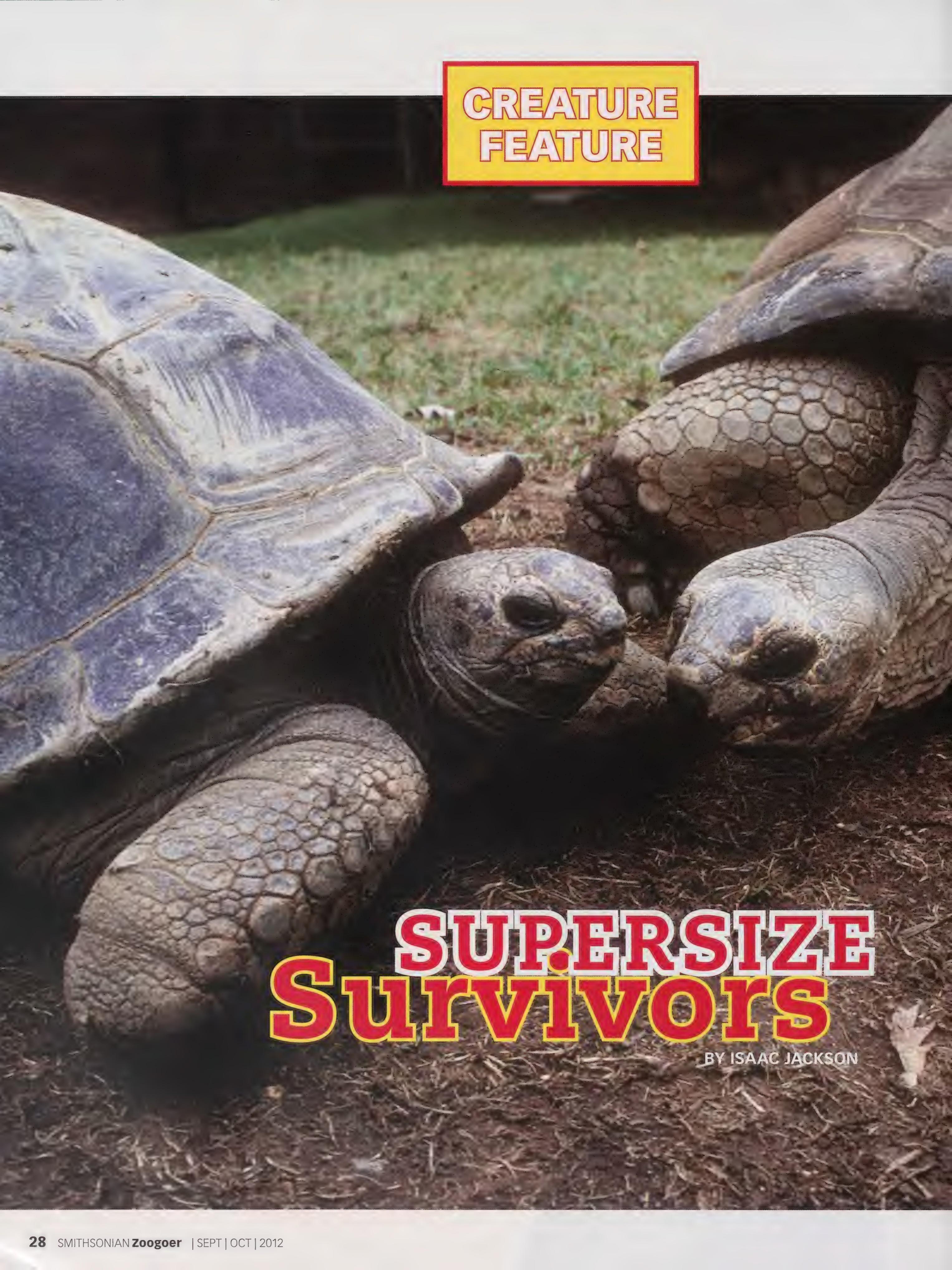
JESSIE COHEN/NZP

**Zoo Clue**

This venomous snake is named for a body part it doesn't actually have! Learn more at [nationalzoo.si.edu/goto/zooclue](http://nationalzoo.si.edu/goto/zooclue).



JESSIE COHEN/NZP



**CREATURE  
FEATURE**

# **SUPERSIZE Survivors**

BY ISAAC JACKSON

### Big BEASTS

Aldabra tortoises are the second largest tortoises on Earth. Males generally weigh about 400 pounds, while females are roughly 300. Some, though, have grown to be more than 500 pounds! The tortoise's shell can be three to five feet long. Only the Galápagos tortoise is bigger.

### ISLAND Living

Home for this big beast is the Aldabra Atoll, a group of islands made of coral. The islands lie in the Indian Ocean, about 265 miles northwest of Madagascar. Aldabra tortoises are the last survivors of a group of giant tortoises once found on a variety of Indian Ocean islands. These reptiles are considered vulnerable in the wild.

### Shell SHAPES

The shape of an Aldabra tortoise's shell depends on where it lives and what it eats. In some places, the reptile nibbles leaves from bushes above its head. So its shell arches above the neck, allowing the animal to stretch and feed. In other areas, the tortoise grabs grass and other plants from the ground. Then its shell extends over its neck, providing extra protection.

### TORTOISE Tanks

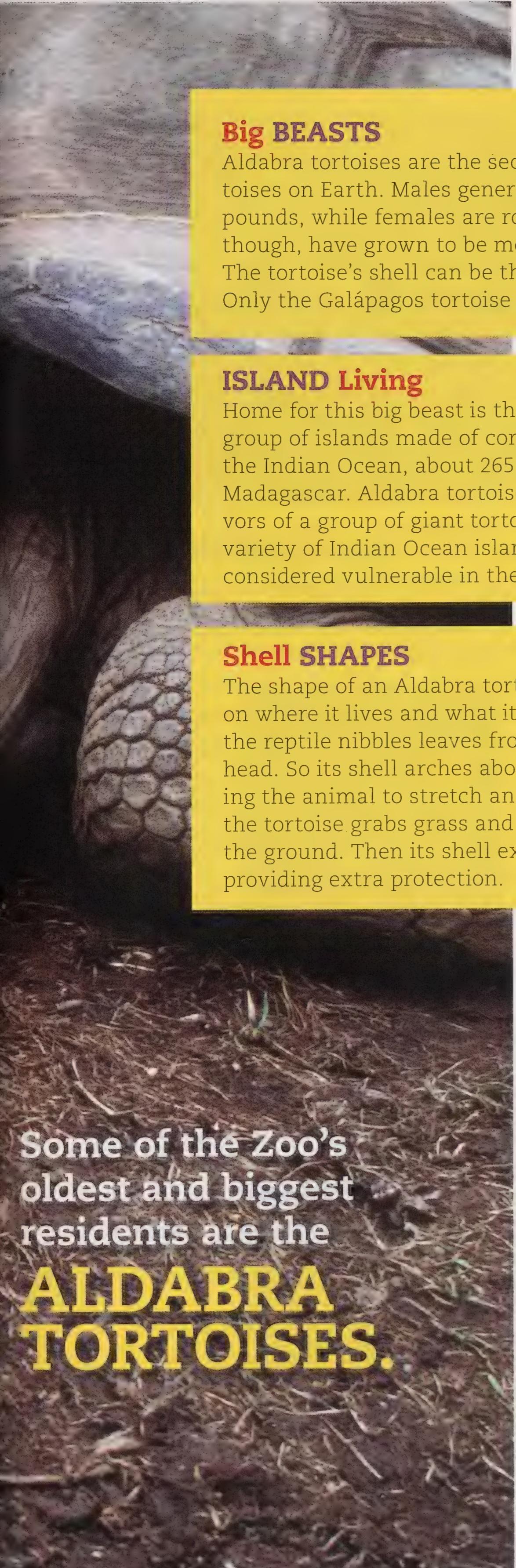
Much like the elephant, the Aldabra tortoise is the largest animal in its habitat. It moves over the landscape like a tank, eating its way through tall grass. The tortoise can even knock over small trees to chomp on their branches. All this activity clears pathways that smaller animals use to get around.

### Old GUYS

Nailing down the life span of an Aldabra tortoise is tricky. The animals often outlive the scientists studying them! Experts believe the reptiles usually live about 65 to 90 years. Some tortoises, though, have lived for more than a century.

### At the ZOO

Crawl on over to the Reptile Discovery Center to see our group of Aldabra tortoises.



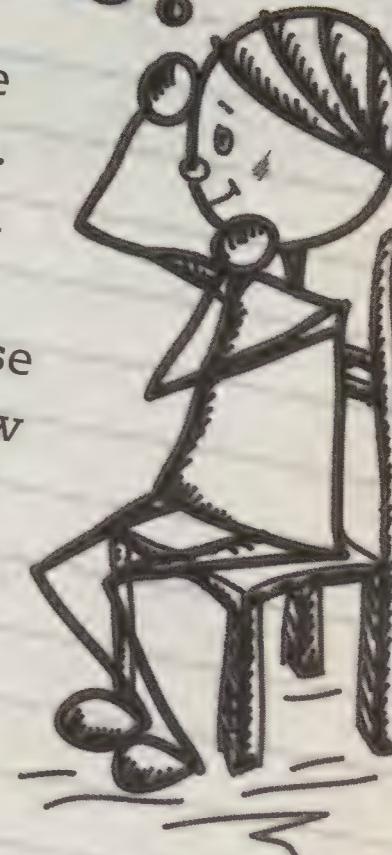
Some of the Zoo's  
oldest and biggest  
residents are the  
**ALDABRA  
TORTOISES.**

JESSIE COHEN/NZP

YOUR TURN

### Picturing Protection

Aldabra tortoises have huge shells to protect themselves. Arapaima have tough scales. And meerkats take turns watching out for danger. Those are just a few examples of how animals defend themselves. If you were a wild creature, how would you protect yourself? Share your thoughts with us at zoogoer@si.edu.



## Cheetah Champion

**As the cheetah biologist at the Smithsonian Conservation Biology Institute, ADRIENNE CROSIER knows pretty much everything there is to know about the speedy mammal.**

**A**fter getting her Ph.D. in reproductive physiology in 2001, Crosier began looking for a job. She hoped to find one that would suit both her scientific knowledge and her interest in wildlife conservation. The search brought her to the Smithsonian's National Zoo, where she began exploring the mysterious lives of cheetahs.

Crosier's passion for Earth's fastest land animal later took her to Namibia, a country in southern Africa. There she worked with the Cheetah Conservation Fund, studying every part of the spotted cats' lives. She also taught local people and other scientists about what she and her colleagues were learning.

Crosier had expected to spend six to twelve months in Africa. She loved it so much, though, that

she wound up staying for more than three years. After returning to the U.S., she became a biologist for the Zoo's Smithsonian Conservation Biology Institute.

### Cheetah Chores

Crosier spends most of her time researching cheetahs. She focuses especially on their breeding, which scientists

are still trying to understand. Right now, her major project is studying how to move embryos, or fertilized eggs, from one female to another. This, she says, could be an important breakthrough, since some cheetahs either won't breed or can't get pregnant.

Crosier's daily routine includes many different activities. "I get to do a little bit of everything, which I really like," she says. "I am responsible for various animal care tasks, such as monitoring breeding, and examining newborns."

Crosier has another big job too. She is the reproductive adviser for the Species Survival Plan for cheetahs. That's an effort in which different zoos work together to create a healthy population. Crosier helps figure out how to help the cats reproduce when they can't do so naturally. She also works to inform people around the world about the best ways to save these at-risk animals.

Her job as an educator doesn't end there, though. She works closely with graduate students who are training to become scientists. And she publishes results of her own research, contributing to the world's knowledge of these cool cats.

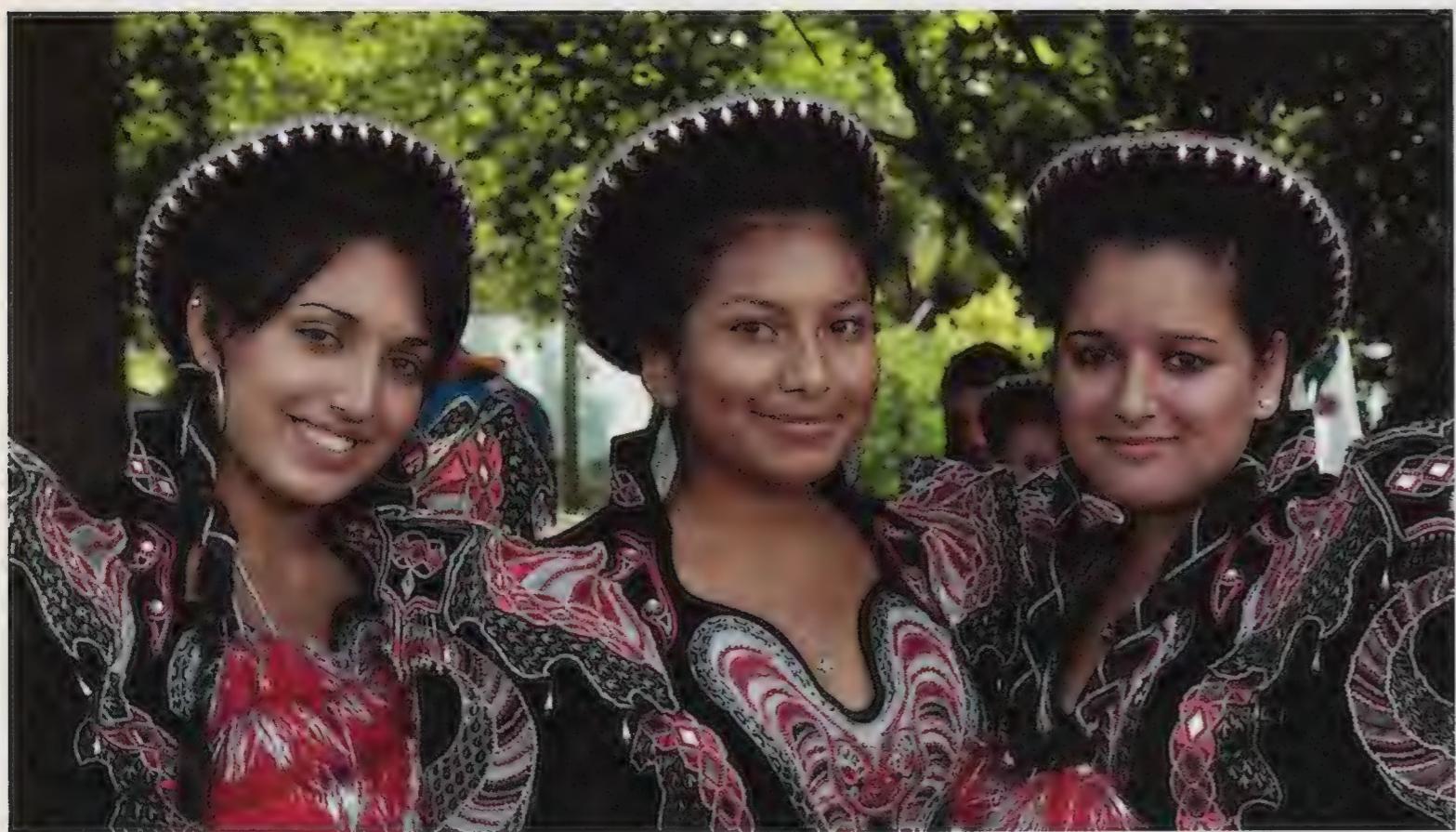
### A Favorite Focus

One of Crosier's favorite parts of her job is working with cheetah cubs. Because it's so difficult to breed cheetahs, working with a litter is very rewarding. That experience motivates Crosier to continue her hard work, pressing for breakthroughs that will help cheetahs survive. Besides, the newborns are ridiculously cute!

Back when Crosier first started working with cheetahs 11 years ago, she knew little about them. Luckily, that didn't stop her. She advises young scientists to be equally determined. "Never close the door to any opportunity," she says. "You never know what's going to come from it."

— Isaac Jackson

## FALL FESTIVITIES

**Fiesta Musical**

September 16  
Celebrate Hispanic Heritage Month at our FREE festival. Listen to music, watch costumed dancers, buy craft products, and enjoy Latin American food. Learn more at [fonz.org/fiesta.htm](http://fonz.org/fiesta.htm).

MEHGAN MURPHY/NZP

**Grapes With the Apes**

September 20

Enjoy fine wine and music while supporting conservation. Learn more at [fonz.org/grapes.htm](http://fonz.org/grapes.htm).

**Rock-N-Roar**

September 27  
Journey back to the eighties aboard the music of Gonzo's Nose, the most popular party band in the Washington area. Enjoy a gourmet meal at the Whole Foods Market Super Rad VIP Lounge. Learn more at [fonz.org/rock.htm](http://fonz.org/rock.htm).



MEHGAN MURPHY/NZP



MEHGAN MURPHY/NZP



JESSIE COHEN/NZP



MEHGAN MURPHY/NZP

**Boo at the Zoo**

October 26-28

The Zoo turns into a Halloween wonderland, teeming with treats and games and treasures. Learn more on inside back cover.

## FONZ RESOURCES

[fonz.org](http://fonz.org)

Membership Information  
202.633.2922

Special Events  
202.633.4470

Development Office  
202.633.3033

Camps and Classes  
202.633.3024

Volunteer Services  
202.633.3025

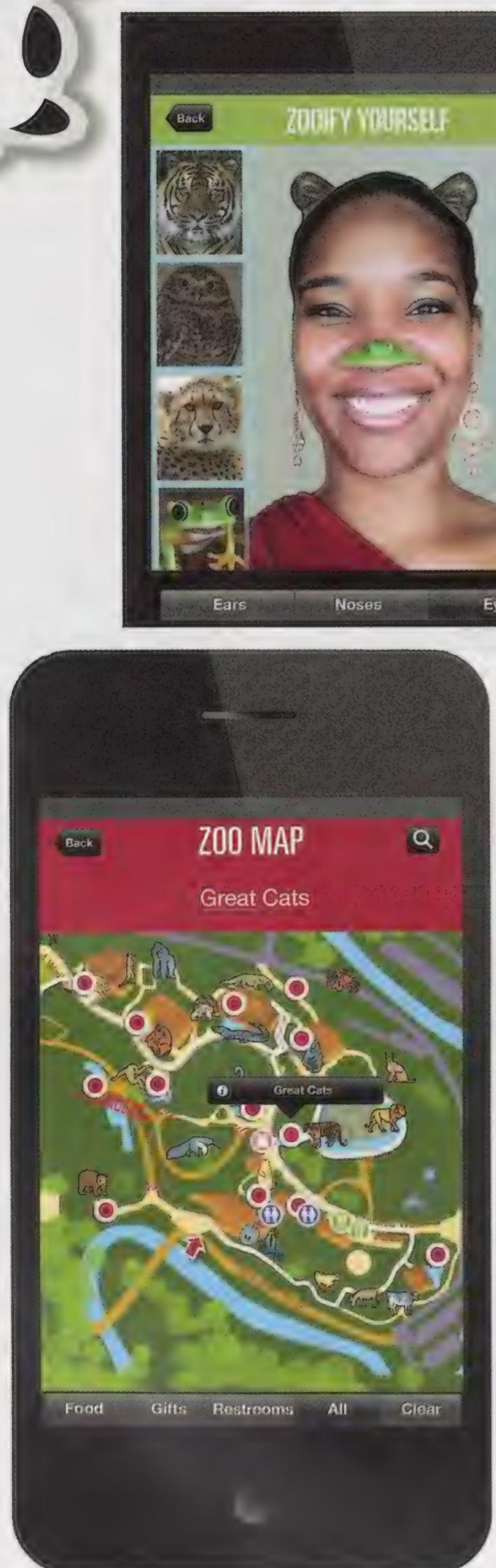
## Comments? Questions?

Please email us at [fonzmember@si.edu](mailto:fonzmember@si.edu)

Not a FONZ member yet?  
Call 202.633.3034  
or go to  
[fonz.org/join.htm](http://fonz.org/join.htm)

**Autumn Conservation Festival**

October 6-7  
Once a year, the Smithsonian Conservation Biology Institute opens its Front Royal campus to the public. Learn more on p. 33.



## National Zoo Smartphone App

**This past August, the Zoo launched its first mobile app,** available for \$1.99 from the App Store and Google Play. Proceeds will go toward the Zoo's work of animal care, conservation, research, and education.

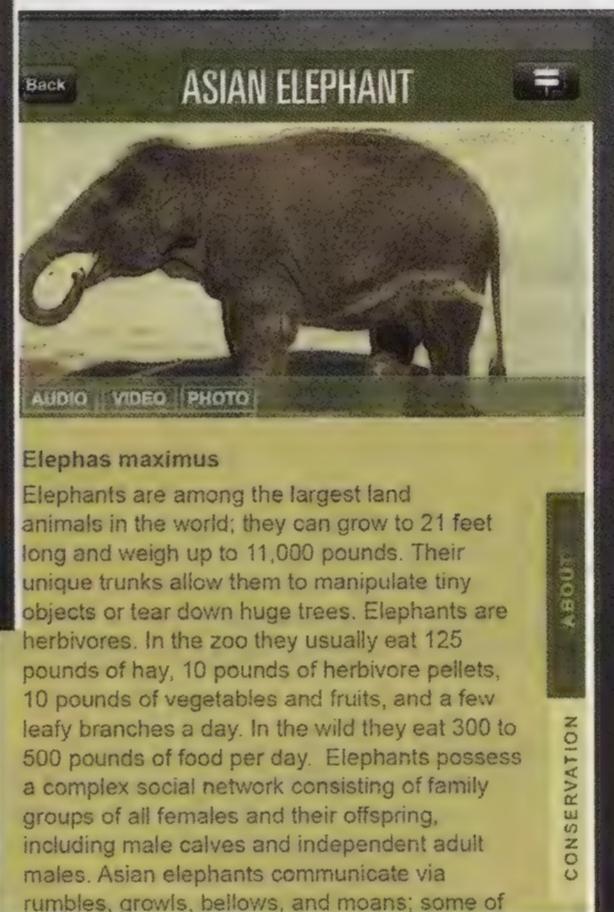
The app enriches visitors' experiences in a variety of ways. Users can chart their path through the park with help from an interactive, GPS-enabled map that points them toward not only animal exhibits but also restrooms, food concessions, gift shops, and other amenities. Guests can also follow suggested tours based on their interests and time available. In addition, they can get details about the more than 30 animal demonstrations that take place each day.

The app also provides a wealth of animal information. Users can read profiles about more than 300 species and watch six of the Zoo's most popular live webcams, including one focused on our wildly popular giant pandas.

Young visitors can enjoy a special kid-friendly tour, listen to animal noises, find fun facts about the Zoo's inhabitants, and

"Zooify" themselves by adding animal features to photos of themselves.

The National Zoo app is one of nearly 20 apps featuring different facets of the Smithsonian. You can find more at [si.edu/Connect/Mobile](http://si.edu/Connect/Mobile). Don't miss the new Smithsonian Tours app, which can help you customize your visit to the Institution's legendary museums.



## FONZ Board Election

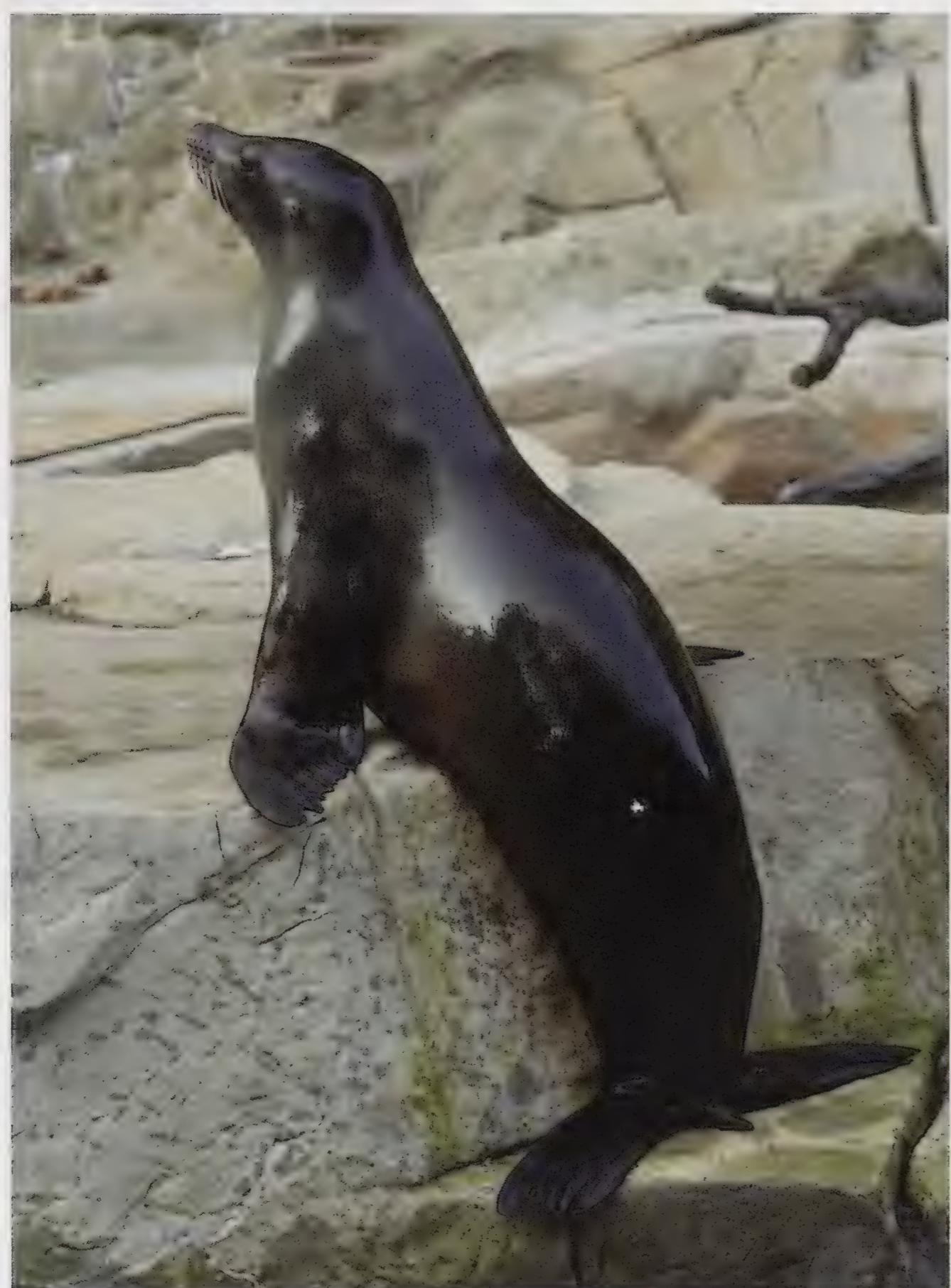
Eight members of the FONZ Board of Directors are up for reelection this year. Because of the number of members eligible for another term and given the large size of the Board, we did not seek additional nominations this year.

We now invite our members to review the candidates' biographical information and cast their votes at [fonz.org/ballot.htm](http://fonz.org/ballot.htm). If you prefer a hard copy of the ballot, please contact the FONZ Executive Office at 202.633.4379. The deadline to vote is October 23, 2012.

## FONZ Annual Meeting

**October 30, 6 to 8 p.m.**

You're invited! Meet and mingle with your fellow Friends of the National Zoo members at the 54th FONZ Annual Meeting in the Zoo's Visitor Center auditorium. Events will kick off at 6 p.m. with light refreshments, followed by updates on FONZ and Zoo accomplishments and plans, as well as the introduction of newly elected members of the FONZ Board. Reserve your place at [fonz.org/annualmeeting.htm](http://fonz.org/annualmeeting.htm).



## American Trail Adoption Opportunity

Celebrate the opening of the Zoo's magnificent new American Trail by adopting a California sea lion, one of the exhibit's star inhabitants. The Zoo is home to four of these marine mammals, all female. They are Sidney (3 years old), Summer (7 years old), Calli (7 years old), and Calli's pup, Sophie (1 year old).

Wild California sea lions live along the West Coast, from British Columbia to Baja California. Once hunted for their skin and oil or killed by fishermen, the animals suffered a worrying decline. Today, however, they are protected by laws and international agreements, and have made a comeback.

For \$65, you or a loved one will receive a 12-inch sea lion plush animal, a personalized adoption certificate and letter of appreciation, a frame-quality photo, and a California sea lion fact sheet—all delivered in an adorably appropriate animal carrier box. And, of course, you'll have the abiding satisfaction of knowing that you are supporting the work of the Smithsonian's National Zoo.

Learn more at [fonz.org/adopt.htm](http://fonz.org/adopt.htm).

# A day in the country. A lifetime of learning.

Join us at the Autumn Conservation Festival for an unforgettable day in the foothills of the Blue Ridge Mountains. This is the only weekend of the year when the Smithsonian Conservation Biology Institute (SCBI) is open to the public. Come get a sneak peek at endangered wildlife and meet the scientists who work with them.

Find out about our exciting new Academic Center—The Smithsonian-Mason School of Conservation, a partnership with George Mason University (GMU)—and how it will impact the future of conservation. Enjoy live entertainment, animal tours and family activities. Don't miss this exclusive opportunity to have a day of fun in support of the Zoo's work to advance conservation education and research.

Car passes required for admission. Passes are free to FONZ SCBI Club members; \$30 otherwise. Maximum of six people per car and pass. Each additional person is \$5. Get your pass today at [www.fonz.org/acf.htm](http://www.fonz.org/acf.htm).

Smithsonian's National Zoo

AUT<sup>MN</sup>  
CONSERVATION  
FESTIV<sup>L</sup>

October 6-7, 2012  
10 a.m.-3 p.m.  
Smithsonian Conservation  
Biology Institute  
Front Royal, Virginia

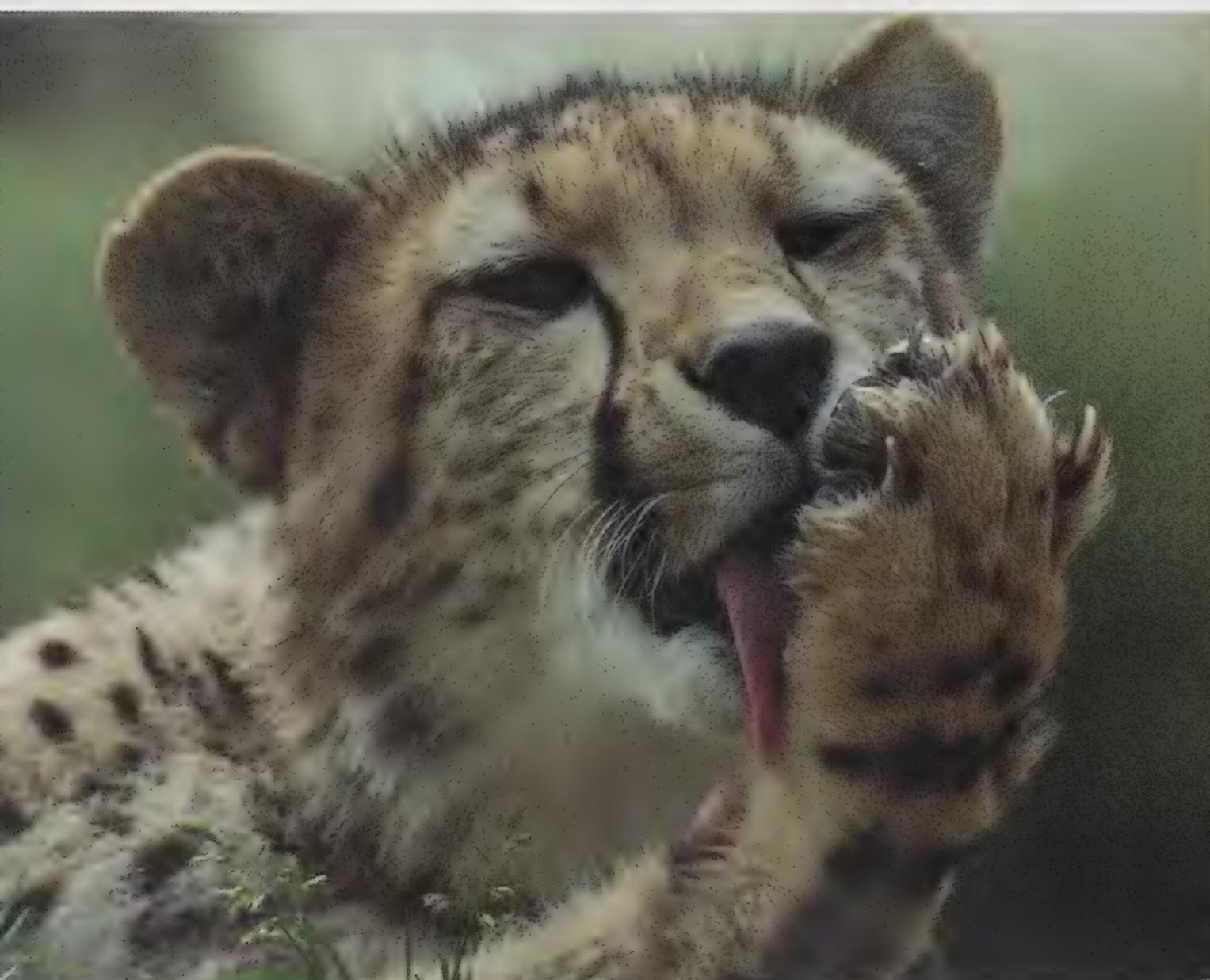
## FONZ CLASSES

### Learn at the Zoo!

FONZ classes give children a deeper understanding of animals, their behaviors, and their habitats. Children's classes are open to FONZ members at the household level or higher.

Varying somewhat in structure, classes generally include hands-on activities, crafts, and time in the Zoo. Please note that classes do not include behind-the-scenes visits or direct contact between children and animals. Classes meet in the Visitor Center unless otherwise noted.

Register online at [fonz.org/classes.htm](http://fonz.org/classes.htm).



#### PRESCHOOL CLASSES

These programs invite adults and children to discover the Zoo together. All children must be accompanied by an adult. For everyone's safety and enjoyment, unregistered children and siblings may not attend—except for infants who do not yet crawl.

#### BACKYARDIGANS

Discover the Zoo in your backyard. We're digging up a good time discovering animals that live close to home. Learn about our feathered, furry, and creepy-crawly friends, then head out into the park to meet your neighbors and see some of their more exotic cousins.

**AGES:** 2-3  
**DATES:** Sept. 15, 22, 29  
**TIME:** 10-11:30 a.m.  
**FEES:** \$25 each

**Sept. 15:** Backyard Crawlies  
**Sept. 22:** Backyard Fliers  
**Sept. 29:** Backyard Slimeys

#### SEE SPOTS RUN

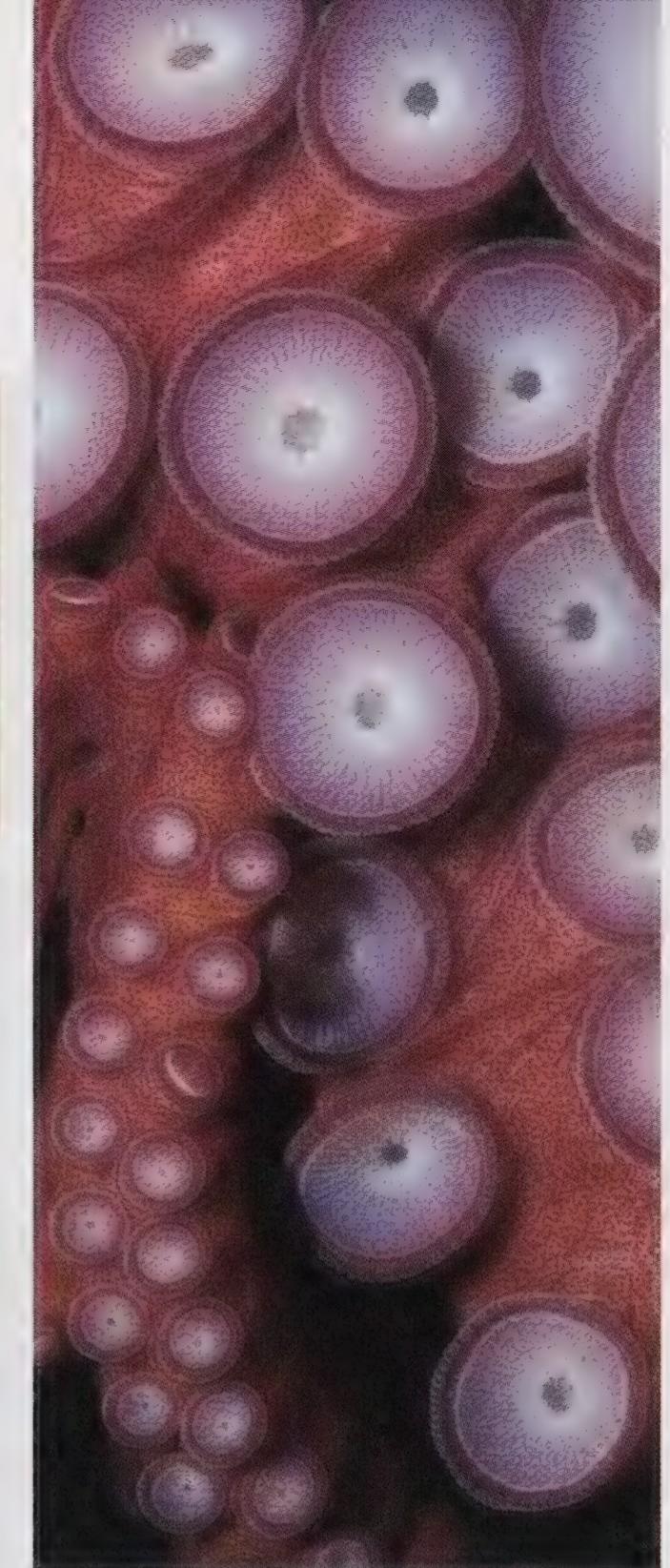
This class will have you seeing spots! Connect the dots through the Zoo as we explore the animal kingdom. Each week, we'll learn about a spotted creature through play, art, stories, and more. It's sure to hit the spot!

**AGES:** 2-3  
**DATES:**  
**Session 1:** Oct. 1, 15, 22, 29; Nov. 5  
**Session 2:** Oct. 2, 16, 23, 30; Nov. 6  
**Session 3:** Oct. 3, 17, 24, 31; Nov. 7  
**Session 4:** Oct. 4, 18, 25; Nov. 1, 8  
**Session 5:** Oct. 5, 19, 26; Nov. 2, 9  
**TIME:** 10-11:30 a.m.  
**FEES:** \$125

#### NEW AT THE ZOO

Sea lions, otters, and cubs—oh my! The season isn't the only thing changing at the National Zoo. Explore the homes of our newest residents on American Trail, Asia Trail, and Cheetah Conservation Station. No clicking of heels necessary!

**AGES:** 2-3  
**DATES:** Oct. 2, 9, 16, 23, 30  
**TIME:** 1-12:30 p.m.  
**FEES:** \$125



JESSIE COHEN/NZP

#### BUBBLE GUPPLES

There's water, water everywhere. Many creatures call it home. Get your flippers ready as we dive deep into learning about our water wonders! We'll explore their habitats and adaptations through crafts and science experiments. It's sure to be a splash!

**AGES:** 2-3  
**DATES:** Oct. 7, 14, 21  
**TIME:** 10-11:30 a.m.  
**FEES:** \$25 each

**Oct. 7:** Octopus  
**Oct. 14:** Seals and Sea Lions  
**Oct. 21:** Flamingos

#### PAWS, CLAWS, FEET, AND HANDS

If you love the Zoo, raise your hand. Or paw or talon or tentacle or pad. We're learning about animal adaptations. Discover how specialized body parts help creatures survive, and practice essential school skills. You'll want to get your hands on this class!

**AGES:** 2-3  
**DATES:**  
**Session 1:** Nov. 26; Dec. 3, 10, 17  
**Session 2:** Nov. 27; Dec. 4, 11, 18  
**Session 3:** Nov. 28; Dec. 5, 12, 19  
**Session 4:** Nov. 29; Dec. 6, 13, 20  
**Session 5:** Nov. 30; Dec. 7, 14, 21  
**TIME:** 10-11:30 p.m.  
**FEES:** \$125



MEGAN MURPHY/NZP

### CHILDREN'S CLASSES

Parents are not encouraged to stay with the class, but may if they wish (for no charge).

### ANIMAL ATHLETES

The Olympics may be over, but the games never end at the National Zoo! Explore the fascinating abilities of our animal athletes. Learn about the critters who would surely win the top prizes in strength, swimming, and gymnastics. Go for the gold and register now!

**AGES:** 4-6

**DATES:** Sept. 16, 23, 30

**TIME:** 10 a.m. – 12 p.m.

**FEES:** \$28 each

**Sept. 16:** Elephants  
**Sept. 23:** Seals  
**Sept. 30:** Orangutans

### SUNDAY MORNING FOOTBALL

Are you ready for some football? Join the team as we tackle the new American Trail exhibit and learn about the real-life mascots of the NFL: the Baltimore Ravens, Philadelphia Eagles, and more. The class is up, and it's good!

**AGES:** 7-9

**DATE:** Sept. 30

**TIME:** 10 a.m. – 12 p.m.

**FEES:** \$28

### WATER WONDERS

Packed up the snorkel and bathing suit for the winter? No worries! We're splash-splashing away at the National Zoo (no towels required!). Discover the underwater world and meet those that call the waves their home. Get your feet wet preparing for school as you sing songs, make crafts, and participate in science-based activities.

**AGES:** 4-6

**DATES:** Oct. 6, 13, 20, 27

**TIME:** 10 a.m. - 12 p.m.

**FEES:** \$25 each

**Oct. 6:** Octopus  
**Oct. 13:** Otters  
**Oct. 20:** Flamingos  
**Oct. 27:** Sea Lions

### THE CARE OF MAGICAL CREATURES

Calling all wizards (and Muggles too)! Before things start going bump in the night, check out what's going boo at the Zoo! Grab your wand and jump on your Nimbus 2000. It's sure to be a magical day. (Dressing in costume is encouraged!)

**AGES:** 7-9

**DATE:** Oct. 28

**TIME:** 10 a.m. – 12 p.m.

**FEES:** \$28



ANN BATDORF/NZP

### AFTER-SCHOOL PROGRAM

Learning doesn't have to end when the bell rings. Keep your child away from the television and computer games for just a bit longer and continue the fun at the National Zoo! FONZ's after-school program incorporates Maryland, Virginia, and D.C. standards, providing an extension to classroom lessons while also being a grrreat time. It's the perfect combination of education, animals, and fun. So sign up your cub for the club today!

### AROUND THE WORLD

What kinds of animals live on an African plain or in a North American forest? Traveling at the speed of one continent a day, you may be surprised at the fascinating fauna you'll encounter along the way. Passports not required!

**TIME:** 4-5:30 p.m.

**FEES:** \$100

**DATES:**

**Grades 2-3: Sept. 11, 18, 25;  
Oct. 2, 9**

**Grades 4-5: Sept. 12, 19, 26;  
Oct. 3, 10**



## Puzzled Pause

**"The cubs were exuding enthusiasm the moment they bounded into the yard," says FONZ Photo Club member Jim Jenkins.** He watched avidly as the Zoo's youngest cheetahs explored their outdoor enclosure. As a truck rumbled by in the distance, the spotted cats stopped, looked, and listened—creating an incredible photo opportunity. When not taking photos of Zoo animals, other wildlife, landscapes, flora, people, or architecture, Jenkins works in the IT field.

**Technical Notes —** CAMERA: Nikon D800; FOCAL LENGTH: 400mm; EXPOSURE: 1/5,000 sec at f5.6

### Smithsonian Zoogoer

welcomes FONZ members' submissions of photos taken at the Zoo. Please send photos to [zoogoer@si.edu](mailto:zoogoer@si.edu). We will contact you if we are able to use your picture for the Zoo View page.

# All treats. No tricks.

Don't miss Boo at the Zoo.

**October 26, 27, & 28, 2012  
5:30–8:30 P.M.**

\$20 FONZ members; \$30 nonmembers



Celebrate Halloween at the 14th annual Boo at the Zoo! With more than 40 treat stations, animal encounters, and decorated walkways, this safe and spooky event at the Smithsonian's National Zoo is fun for the whole family. Proceeds benefit animal care, education, conservation science, and sustainability programs at the Zoo. Get tickets at [fonz.org/boo.htm](http://fonz.org/boo.htm), any Ticketmaster outlet, or National Zoo Store. Tickets purchased at the National Zoo have no added fees.

**Boo at the Zoo is generously sponsored by:** BIG 100.3, The Coca-Cola Company, Comcast, FedEx and Safe Kids USA, HOT 99.5, HSB/Whitmore, Mars, Incorporated, 97.1 WASH-FM, Washington Parent, Whole Foods Market, 98.7 WMZQ, Yellowbook

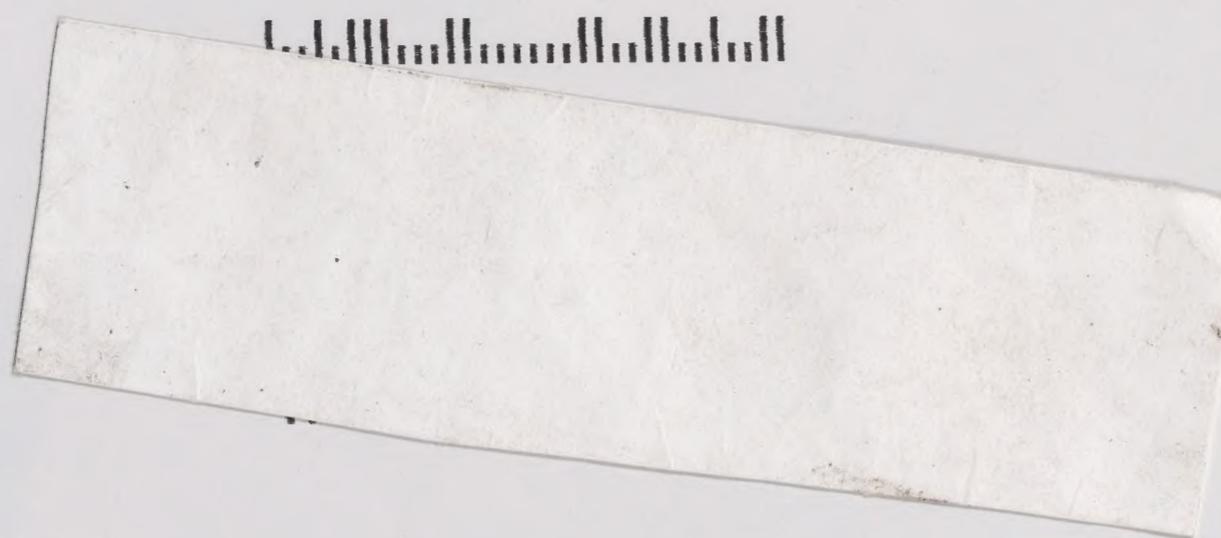


Friends of the National Zoo, PO Box 37012, MRC 5516, NW, Washington, DC 20013-7012, [www.fonz.org](http://www.fonz.org)



Smithsonian  
National Zoological Park

The American Trail exhibit has opened to rave reviews. Including those from our toughest critics. Visit soon and see what all the barking is about!



**Thank you for being a FONZ member.**  
Your membership supports animal care, science, conservation, and more.

